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THE

OPHTHALMIC RECORD

A Monthly Review of the Progress of Ophthalmology

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THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
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Vol. XXIII CHICAGO, JANUARY, 1914 No. 1, New Series

ORIGINAL ARTICLES

A CASE OF LATE INFECTION AFTER ELLIOT'S TREPHINING.

BY H. GIFFORD, M. D., OMAHA, NEBR.

In doing an Elliot's trephining, the ordinary precautions seem to be sufficient to guard against infection at the time of the operation: not so however against a secondary infection. At the Heidelberg Congress in 1912, Wagenmann,[1] in a discussion on trephining, mentioned a case in which, some time after a successful trephining, a late-infection of the anterior chamber occurred. The final outcome is not given. This remained an isolated case till June of this year, since when, twelve additional cases of late-infection, after Elliot's operation, have been reported. Of these, the cases of Stock, Story, Morax, Wicherkiewicz and Bronner were mentioned at the London International Congress, in the discussion of the papers of Lagrange and Elliot.[2] Stock's two cases occurred sometime after trephinings at which the flap was buttonholed. One of these led to panophthalmitis, the other to purulent iritis with much reduction of sight. In Story's case, the infection set in several weeks after the operation and led to phthisis bulbi. Bronner observed severe plastic iritis in two cases, several weeks after the operation: while in a third, his patient developed panophthalmitis. The cases of Morax and Wicherkiewicz were merely mentioned without details.

The other cases were the following: Isakowitz,[3] severe purulent iritis six weeks after trephining: operation smooth, no reaction; no conjunctivitis nor other complication to account for infection. At time of writing report, it looked as if patient would not recover any sight.

Schur's[4] patient did well for five weeks after the trephining. She then struck the eye against a chair and the eye promptly developed a purulent iritis and was enucleated. The microscopic examination showed a line of infection beginning in a small epithelial defect a little below the trephine hole. The latter was found to be placed too far back, so that the line of infection which led to it, from the epithelial defect, proceeded into both the anterior chamber and, through the ciliary body, into the vitreous.

In Harm's[5] case, the eye was perfectly quiet and satisfactory for about six weeks, when it began to have spells of irritation with photophobia and lachrymation, without any well defined cause. Five months later, without any special cause, a violent infection started up with exudate and pus in the a. c.; much congestion, especially in the neighborhood of the filtration-bleb which, when fluorescein was used, showed a large epithelial defect. After cauterization of the bleb and paracentesis the condition improved somewhat but a slow iridocyclitis set in which promised, at last account, to blind the eye. An interesting feature of this case is the fact that the other eye was operated about the same time, but as the flap was perforated, the conjunctiva was loosened along the limbus and drawn down over the cornea. For some time after the operation the filtration-bleb was as prominent in this eye as in the other, then it flattened down and disappeared. This eye showed none of the spells of irritation which bothered the other eye, in which the bleb persisted; and Harms concludes that the determining factor in this infection was the irritation of the bleb by the movements of the lids and the eye-ball.

Kuhnt[6] trephined both eyes of his patient. In the right the filtration-bleb gradually flattened down completely, while in the left the bleb remained. About three and a half months later, he developed a conjunctival catarrh of both eyes; under the influence of which, the conjunctiva of the bleb in the left eye became markedly loosened up. About two weeks later, the eye suddenly became blind and was found to have purulent iridocyclitis, with the conjunctiva over the trephine hole grayish yellow, thick and eroded. Under vigorous treatment with mercury, pilocarpine and Roemer's pneumococcus-serum, the inflammation gradually subsided and the vision rose to nearly what it had been before the infection. Then the filtration-bleb gradually disappeared and the tension, whch had been normal, rose to 30 m. m. and the field began to contract.

Beside these infections after trephining, Axenfeld[7] and Pagenstecher[8] report similar experiences with the iridosclerectomy of Lagrange. Axenfeld's patient maintained a hypotension with well marked filtration-bleb for about nine months after a Lagrange operation. Then, without apparent cause, the eye got red and the bleb showed a yellowish gray infiltrate with a minute fistula at its summit. Then a severe purulent iritis developed which gradually yielded to treatment; but with the cure of the iritis the bleb disappeared and the tension rose above the normal.

Pagenstecher mentioned his case at the discussion in London. The patient did well for a month after a faultless Lagrange. Then purulent iritis appeared but it yielded to treatment.

My own experience with infection after trephining, in the thirty cases in which I have done the operation, is confined to the following case: H. O., aged 48, came to me 9-4-13 with the right eye blind from an injury received some years before. The left eye had vision reduced to fingers at three to four feet as the result of irido-cyclitis, with occlusion of the pupil; tension 40 m.m. The right eye was eviscerated and the left eye trephined with an iridectomy. In doing the operation, I took extra pains to carry the flap as far over the cornea as possible, but did not split the cornea in the manner recommended by Elliot. No reaction followed: the tension was reduced to well within the normal limits, and he went home a week later. The only thing unusual about the appearance of the eye a week after the operation, was that the membrane covering the hole was unusually thin, protruding like a part of a thin bubble. He returned two weeks after the operation stating that, for a couple of days the eye had been discharging freely and had given him much pain. I found him to have a marked catarrhal conjunctivitis with much congestion of the globe. There was also a slight amount of pus in the anterior chamber, and with oblique illumination, a line of purulent exudate could be traced from the trephine hole past the coloboma, behind the iris and out through the pupil into the anterior chamber. The membrane of the ball was congested and thickened, but not eroded so far as I could determine. On paracentesis, mercury and salicylates, the eye improved somewhat; the formation of pus stopped and the inflammation decreased, but the eye is still decidedly inflamed, and the prospect for useful vision is very pood. Am not sure whether the inflammation of the conjunctiva in this case was primary, or whether it followed the intra-ocular infection. It yielded promptly to the use of zinc.

These cases make it perfectly clear that the fistulizing operations, that is, the Lagrange, the Elliot and all their various modifications which depend for their efficacy on the production of a subconjunctival fistula, carry with them the danger of late infection. Moreover, the more successful the operation from the standpoint of pressure-reduction, the greater the danger. The case of Kuhnt illustrates this most beautifully. Both eyes were trephined. In the left the conjunctival bleb persisted and the tension remained low; while in the right the bleb gradually disappeared and the tension rose to over 30 m. m. But when, later on, both eyes developed a catarrhal conjunctivitis, only the one with the bleb became infected. Axenfeld says that the cases which, after trephining, show a clear glassy bleb always give him a feeling of anxiety. Stock, whose infections followed operations with buttonholed flaps, advises that when the flap is perforated it is better to interrupt the operation and make a fresh start. Bronner, whose experience has been especially bad (3 cases of infection), declares that, for himself, he would prefer the safer, if somewhat less effective iridectomy. Opposed to these unfortunate results is the very significant fact that neither Lagrange nor Elliot has seen a case of late infection: and while the latter admits that the nature of much of his clinical material makes it easily possible that he might have had one with its being reported, I think there is a very decided probability that his technique is in large measure responsible for his freedom from infections; and the same applies with greater force to the results of Lagrange. The latter advises to cut the flap thick, while Elliot burrows in between the layers of the cornea in such a way as to make the central portion of his flap extra thick. Whether time will prove it to be possible to make the flap so thick as to entirely prevent late infections, without interfering with the efficacy of the fistula remains to be seen. Axenfeld[9] raises this point, and Kuhnt insists strongly that to get a good fistula we must have a thin flap. He suggests that it may be possible, by touching the bleb with tincture of opium or something of the sort, to increase its resistance to infection. The results of Lagrange and Kuhnt however, indicate that a sufficiently thick flap to insure against infection is not inconsistent with good pressure-regulation. As a matter of prudence however, we might in the future warn patients with conjunctival blebs to pay special attention to the hygiene of the conjunctival sac and to the condition of the lachrymal passages. Patients living far from any oculist should keep a zinc collyrium or something of the sort on hand to combat the first symptoms of catarrhal conjunctivitis; and the importance or reporting to the oculist at regular intervals for inspection of the bleb with the aid of fluorescein, should be urged.

Of course, the fact that late infection sometimes occurs after fistulizing operations is no more a warrant for discarding them, than a similar late infection which sometimes occurs after a cataract-expression is for a return to the practice of couching, since many cases of glaucoma can be cured by these operations which are otherwise incurable; but it certainly raises the question, whether their use is justifiable in all forms of glaucoma, especially in acute glaucoma, where a single iridectomy usually gives such good results; and if the event proves that such late infections are at all common, even with the most approved methods of forming the flap, it may be doubtful whether they should be resorted to until an iridectomy has first been tried. With the exception of the single infection which I have above reported, my experience with trephining has been most satisfactory, although I do not consider it as *easy* an operation as an iridectomy, in chronic glaucoma. There can be no doubt however that there is less chance of doing harm with it, than there is with an iridectomy, where the tension is at all high.

Since the above was written, I have seen a report of Meller's from the clinic at Vienna, (Zeitschrift f. Augenheilk. Nov. 1913, 448), where out of 389 sclerectomies according to Lagrange, 1.3% of the eyes were lost by late infection; while with 178 Elliott operations, late infection apparently was not observed; although 2.4% of bad results were obtained as opposed to 10% of bad results with Lagrange's operation.

In the discussion of Meller's paper, Elschnig reported an additional case of late infection after trephining, and predicted that in a few years fistulizing operations would be given up in favor of iridectomy and cyclodialysis. I have also noted the cases reported by Fehr (Wollfberg's Wochenschr. Nov. 13th, 1913, 85), in which a case of infection from latent dacryocystitis occurred ten days after trephining. At an address delivered at the recent Clinical Congress in Chicago, I predicted that it would not be long before cases of sympathetic ophthalmia were reported after trephining, and Dr. Wood informs me that Dr. Spalding of Portland. has already written him of having seen such a case, together with one other of late uveitis after trephining.

1. Wagenmann, Klin. Montsbl. f. Aug. May, 1913, 724.
2. ib. Sept., 402-3-4.
3. Isakowitz, ib. June, 814.
4. Schur, ib. Sept., 377.
5. Harms, ib. Sept., 380.
6. Kuhnt, Zeitschr. f. Augenheilk., August, 1913, 137.
7. Axenfeld, Klin. Monatsbl. f. Aug., June, 1913, 816.
8. Pagenstecher, ib. Sept., 1913, 404.
9. Axenfeld, ib. Sept., 1913, 388.

A FEW REMARKS ON TREPHINING.*

BY R. DENIG, M. D.

Professor of Clinical Ophthalmology, Columbia University, New York City.

The reports on the simplicity of trephining. which were published in the last few years induced me to take up this operation last year.

As I have to date done 21 trephinings and have witnessed about 15 of these operations performed by other surgeons, both here and abroad. I feel justified in reporting my experiences here tonight.

Should trephining be done for all cases of glaucoma?

Undoubtedly trephining allows us to grasp the basis of the iris better than an iridectomy and is in this respect superior to von Graefe's operation. On the other hand, one very serious complication is to be feared—the danger of late infection. So far, 14 cases have been reported where infection took place weeks and months after the operation. The thin covering of the "cushion" formed by the conjunctival flap may become macerated, either spontaneously or as a result of a harmless conjunctivitis and give rise to an infection, involving the entire loss of the eyeball.

Mainly because of this danger, I am in favor of doing an iridectomy in cases of acute glaucoma, except in cases like the one presented by Dr. Wootton tonight, having a very shallow or no anterior chamber.

The same holds true for cases of subacute glaucoma, and only for cases of simple and hemorrhagic glaucoma would I give the trephining the preference.

As regards hydrophthalmus, I am not ready to express any definite opinion, owing to the scarcity of cases on hand.

*Paper read before the Section on Ophthalmology, New York Academy of Medicine, October 20th, 1913.

In a case of iritis with secondary tension, I have done trephining with very satisfactory results. Here trephining is far superior to paracentesis, and we need not fear late infection, as we do not desire the formation of a conjunctival cushion as much as the effects of an iridectomy. In such cases we may form a thick conjunctival flap, consisting of subconjunctival and even episclerotic tissue.

I would also like to suggest trephining in cases of detached retina. In these cases I always performed the time-honored paracentesis of the retro-retinal exudate with the Graefe knife, in the approved way of turning the knife in the wound. I cannot help thinking that such an incision closes up very rapidly and that a trephining, which should cut out only a small hole and leave some sclerotic tissue at the bottom of the disc, will better allow the ultimate absorption of the exudate by a pressure bandage.

In the Ophthalmic Record of 1908 and in the Festschrift for the German Hospital in New York City, 1909, I published some reports on paracentesis of the anterior chamber in cases of inflammations of the uveal tract, iridocyclitis, choroiditis, and also cases of retrobulbar neuritis. Last summer I did, in such a case, a trephining instead of a paracentesis. The sclerotic hole closed up again about three weeks after the operation.

Is the trephining operation from a technical point of view as easy as it is usually pictured?

It happened to me in the beginning and I have seen it in cases operated upon by others, that the entire depth of the disc was not cut out by the trephine, but that, perhaps, a thin sclerotic thread remained by which the disc was still attached to the sclerotic and had to be severed by a pair of scissors.

I consider it of great importance that the trephine only should be used for freeing the disc cleanly from the corneo-sclerotic tissue, otherwise the canal may soon close up again. Of course we must guard against a disappearance of the disc into the anterior chamber, though, if this should happen, it will do no harm. The trephine should cut out a clean hole through the entire thickness of the tissues, no fibers should be left at the bottom and no scissors be used for freeing the disc.

We know when the trephine cuts through, either by the touch or by the pupil moving slightly at this moment towards the place of trephining.

As a rule the trephine cuts through in the cornea first; I then remove the instrument, push the disc back a little to guard against its disappearance in to the anterior chamber, and then finish the trephining.

Should an iridectomy be added?

If possible, by all means for obvious reasons.

One case was reported by Stock and I saw one in my own practice, where the iris did not prolapse on account of an obliteration of the iris angle.

In both of these cases, weeks after the operation, the iris was finally pushed into the wound and a staphyloma was formed. If the iris does not show any tendency to prolapse, I consider it risky and dangerous to pull it out by means of a fine forceps. The case I just referred to was one of hemorrhagic glaucoma in a man 58 years of age. After two trephinings, combined with an excision of the iris had been made at an interval of about two months—each reducing the tension for a few weeks to normal—a third trephining was performed. The iris did not prolapse and about two months later, as the tension went up again, a small round staphyloma had formed. As the tension was very high, I finally removed the eyeball.

Just a few words on the preparation of the conjunctival flap.

As the operation is performed principally on elderly people, this first step requires some care. The conjunctiva may tear easily, if not gently handled and as we approach the limbus, undermining somewhat the corneal epithelium, this danger increases. As the reports of late infection became more numerous, recommendation was made, to strengthen the conjunctiva by including in the flap subconjunctival and even episclerotic tissue. It remains to be seen, if under such circumstances filtration will take place and a "cushion" be formed. One surgeon made the suggestion to do entirely away with the flap and cover the wound by a conjunctival plastic. This may be well for some cases of acute glaucoma, like the one presented by Dr. Wootton tonight, in which we desire mainly the effects of an iridectomy, but it will not do for cases where filtration is wanted. I may mention that even a badly placed suture, by stretching the conjunctival flap too much, may interfere with filtration. I always put two loose sutures laterally from the wound.

Complications after the operation may be hemorrhages, about which I do not think we need to bother much, and finally some slight iritis, for which we give atropine. In one case, a woman about 60 years old, hypotension of about 12 mm. developed with some haziness of the vitreous: the operation had been done faultlessly and no reason can be given for it.

Finally, I may say a word about the instrument—the trephine. I prefer the hand trephine, because with it I have a finer sense of touch.

**SCLERO-CORNEAL TREPHINING IN GLAUCOMA.

By Luther C. Peter, A. M., M. D., Associate in Ophthalmology, Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Rush Hospital for Consumption and Allied Disease, Philadelphia.

As we view the subject of glaucoma from the standpoint of our knowledge of today, one is impressed with the fact that in simple chronic glaucoma at least, non-surgical treatment plays a minor role. In fact, the condition, whether an acute fulminating glaucoma, or a simple chronic glaucoma, is so grave in character that the case, from the outset, develops a surgical phase. It is a question in my mind as to whether the policy is a good one as practieed by many men, even of today, of treating simple chronie glaucoma by means of drugs so long as central vision and fields can be held approximately normal. It is true many of these cases may be carried along for several years by means of drugs, and regulation of habits of life,—but the tendency in chronie glaucoma is downward, and blindness is as inevitable eventually as blindness from simple optic atrophy. The damage essentially is to the optic nerve, and there is a slow, but sure, optie atrophy developed in all of these cases. A sudden shoek or strong emotion may be the last straw which suddenly will eliminate sight forever from such an eye. It is therefore the policy of prudence to

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**Read before the Surgical Section of the Phila. Clinical Association, November, 1913.

operate at the earliest possible moment after the patient will give his or her consent.

Until two years ago, the operation which yielded the best results in the hands of careful surgeons was that of a broad iridectomy. The studies of Drs. Zentmayer and Posey show that this broad iridectomy had an undoubtedly beneficial effect upon most cases of chronic glaucoma, and that vision was preserved or prolonged for a considerable period, after which blindness supervened.

Many other operations have been devised for the relief of glaucoma,—the most valuable, in addition to the iridectomy and the operation which is under discussion, is that of Lagrange,—which consists in the cutting out of a part of the sclera after the section of the cornea. In the hands of many, this operation has grown quite popular,—especially in view of the fact that permanent results were not obtained by the iridectomy operation.

The third operative procedure which has its special field and is employed occasionally today to good advantage, is that known as cyclodyalisis,—also known as Heine's operation. The advantages claimed for this operation are that in eyeballs of high tension, and where there is danger of an explosive hemorrhage into the vitreous body, this operation accomplishes the lowering of tension slowly, sometimes requiring several days before the tension is materially reduced.

However, each of these three operations mentioned, while adapted to a number of cases, has the disadvantage of not furnishing permanent relief to these sufferers, and second, each one becomes inapplicable for various reasons in an appreciable number of cases.

The sclero-corneal trephining operation, which I believe should be known by this name, and not by the author's (for the name of man applied to operations and diseases is complimentary, but not scientific)—has been perfected by Col. Elliott, of India; and to Col. Elliott the profession owes a debt of gratitude. The operation consists in first, the dissection of a large flap of conjunctiva, preferably from above,—turning the flap down over the cornea, and teasing it from the corneal epithelium until a sufficiently large area of the cornea has been denuded to admit of a 2 mm. trephine. A round opening is made into the cornea by means of the various forms of trephines on the market. The aqueous escapes from the anterior chamber. If the iris engages in the trephine opening, a small peripheral iridectomy is performed, and the conjunctival flap is again replaced, the eye closed, and the operation is complete.

The advantages of this operation over those which I have mentioned are first, the simplicity of technique,—second, the absence of trauma to any of the vital parts of the eye,—third, the permanency of the drainage thus established,—and fourth, its applicability to every case, regardless of the character or stage of the glaucoma.

The technique of the operation is simple, and surgically good. If care is observed so as not to plunge the trephine into the lens capsule, and the opening is made well forward in the corneal tissue, rather than in the sclera, one has every reason to look forward to a good result. The difficulty attending the performance of an iridectomy in an inflammed eye with a very shallow anterior chamber can only be appreciated by the operator,—and the results are not permanent. The Lagrange operation, or sclerectomy, is attended by more trauma than the trephining, and cyclodyalisis must necessarily be attended by more injury to vital parts of the eye than the trephine can inflict, even in the hands of the beginner. On the other hand, the reaction after trephining in most cases is so mild, although prolonged, that the patient rarely complains of discomfort. Some of my earliest cases of trephining were followed by rather protracted, though mild, reactions. This, I believe, was due largely to prolonged manipulation in teasing the conjunctiva from the cornea, and especially to the use of the hand trephine. In a series of twent-six cases, which I either operated on personally or assisted my chief, Dr. Wendell Reber, (all of which I was able to follow in the dressing from day to day until the patient left the hospital) the prolonged and more active reactions occurred in eyes which required either undue manipulation or in which the hand trephine was used. Several eyes were trephined while in a state of inflammation, and in these the reaction was necessarily marked.

During the last year, I have been using the von Hipple spring trephine, and more recently a trephine driven by a dental engine, as devised by Dr. Wendell Reber. A sharp cutting edge is the first essential of the trephine. When mechanically driven with moderate speed, the disc of cornea is removed cleanly and with a minimum amount of trauma.

My reactions now are milder and of shorter duration. In several instances, redness was limited to the area of the flap. The cleanness of the cut I believe, therefore, is one of the essentials of a successful trephining. Cases which have yielded me the best results were those in which the disc was cleanly removed by the trephine. A 2 mm. opening admits of an easy peripheral, or more complete iridectomy of the presenting iris. It is therefore the size of trephine which I have used most frequently in my cases.

As to the final results, it is true the operation is too young to speak authoritatively,—but to speak prophetically from the results thus far obtained, the operation promises to be the operation of the future in all forms of glaucoma. My oldest case, and one of the worst cases in my series, I trephined eighteen months ago. Relief from pain was prompt, as in all cases,—and visual acuity is as good and fields are quite as large today as they were immediately after operation.

Because of the simplicity of technique and the absence of trauma, the operation is one which may be applied to any variety of glaucoma, and at any stage of the disease. In fact, the operator of yesterday approached with temerity many a case of severe glaucoma with a hard eyeball and sight almost eliminated,—and in not a few instances his fears were realized on the operating table in the form of a successful iridectomy, but a sightless eye. I feel that I am voicing the opinion of all who have familairized themselves sufficiently with the technique of the operation and have performed the operation on a number of patients, when I say that we approach a case of glaucoma *in extremis* today with much less doubt as to the outcome. By this I mean explosive hemorrhage and escape of vitreous are not apt to complicate the operation, and even though fields may be reduced considerably, if the optic nerve has not undergone atrophy to too great an extent, one may hope to preserve central vision, and in many instances may look for an enlargement of the fields. This statement has been borne out by most of the cases which have come under my observation.

The value of the operation as a prophylactic cannot be overestimated. Simple chronic glaucoma is a bilateral condition, although one eye may be affected long before the other. In my work, therefore, I am in the habit of operating on both eyes at the same sitting. This, I feel, is a measure which may save many eyes which otherwise might be doomed to blindness.

My experience with the operation has suggested several points in the technique which Col. Elliott, at least in his book, does not advise. First, a mechanically driven trephine revolving with fair speed, and with a sharp cutting edge, produces better results and less trauma than the hand trephine. Second, little difficulty is encountered in separating the conjunctiva from the cornea, and a filtering cicatrix is thereby more fully assured than in the method of splitting the cornea as practiced by Col. Elliott. The well known facility of the cornea to become easily agglutinated argues strongly against this procedure, as it may defeat the object of the operation. It is, as a matter of course, imperative that the corneal surface be thoroughly cleared of shreds of conjunctiva so that the hand trephine will promptly cut into the sclero-corneal tissues. When the mechanically driven trephine is used, this precaution is not of so much moment. Third, atropin should be instilled into the eye on completion of the operation, and on at least three successive days following, to prevent posterior synechia from the quiet iritis which is sure to follow whether an iridectomy has been performed or not. Fourth, I find the conjunctival flap can be held out of the way during the operation by a cotton swab to better advantage than by forceps. By this method, the cornea is not opened to injury, and the constant oozing of blood, which obscures the field of operation, can at once be absorbed. Fifth, a stitch placed in the conjunctival flap to hold it securely in place prolongs the operation but a few minutes and will prevent the accident which occurred in one of my cases,—namely, failure of the flap to unite in the first twenty-four to forty-eight hours after the operation.

The concession committee of the Panama-Pacific Exposition has eliminated in advance an abuse that has been present at many of the great world's fairs, namely, the selling of eye glasses by non-expert vendors. The public's eyesight is not to be trifled with at this exposition by concessionaries who have no qualifications as oculists.

A CASE OF CATARACTA TRAUMATICA ELECTRICA.

By Clarence Ide, A. B., M. D.,
Los Angeles, California.

N. E. C., locomotive fireman: age 33. Between March 18 and 25, 1913, his O. D. was infected by using a common roller towel at a railroad division point. Purulent discharge set in twenty-four hours after using the towel. Probably gonorrhoeal ophthalmia.

On October 18, 1913, C. presented himself to the writer for examination. He reported that following recovery from the previous infection vision was good until August 24, when he was subjected to the glare of an electric locomotive headlight, the engineman turning on the current just as he had finished adjusting a new carbon. He was "blinded" for 2 to 3 hours. The next morning his right visual field was covered with punctate spots and there were the usual external manifestations of ophthalmia electrica. He could see well enough to work the next day. The second day vision had failed in the right eye and since then has failed progressively. Patient reports that the second day after being subjected to the glare he experienced sensations as of a shadow crossing his right field, as if of a body coming from behind. Some physician along the railroad made a diagnosis of intraocular hemorrhage.

Examination—Anterior surface and stroma of cornea clear except for three minute nebulae, the sequellae of the purulent ophthalmia. There is keratitis punctata involving the entire posterior surface of cornea (Descemet's membrane). The iris appears normal with loupe. The pupil is dilated and does not react to light or accommodation: has been under influence of drops (atropine?) for some time at hospital. Was reduced to 5.5 mm. yesterday by the use of drops (eserine?). The cycloplegia may therefore be pathological or the effect of cycloplegic drops.

The lens is the seat of an anterior capsular cataract, milky white, brilliant and superficially situated. This does not reveal the characteristics of the ordinary traumatic cataract, but is the variety described as resulting from subjection to strong electric light or shocks due to proliferation of the capsular epithelium between the capsule and lens, appearing like fibrous tissue.

The tension of the globe is decidedly reduced.

Vision—Is aware of hand movements before bright light.

Tuberculin test (von Pirquet) was negative, as was also the Wassermann test. The latter may have been invalidated by the fact that the man had received seven mercurial inunctions while in the railroad hospital.

COMPLETE PARALYSIS OF OCULOMOTOR NERVE, FOLLOWING INJURY.

By Edwin Cobb, M. S., M. D., Marshalltown, Iowa

On August 8, 1913, I was called to the hospital in consultation by Dr. Chesire to see a case that had been thrown out of a buggy in a runaway accident. Patient was a woman, age 46 years, had been unconscious for ten hours. There was a small discoloration over external and superior margin of orbit. Patient was now conscious, examination revealed a complete ptosis of right lid; widely dilated pupil, with no reaction to light, or accommodation, and external diplopia was present. The eye appeared prominent, slightly bulging, with a tension minus one. The trochlear and abducent nerves responded all o. k. Systemic examination negative as to reflexes, atonia, co-ordination, etc.

A diagnosis was made of complete paralysis of the oculomotor nerve with lesion central, probably due to a rupture of a small vessel. Advised complete rest in bed. At the end of two weeks patient was discharged from hospital and placed on strychnine hypodermatically with increasing doses; massage; electrical treatments with combined galvanic and faradic currents. Also a tonic and daily laxative. Cautioned patient about diet and doing any heavy work. At the present writing, September 22, there is slight improvement in the ptosis, the other lesions remaining about the same.

REPORTS OF SOCIETIES.

ABSTRACT OF PAPERS AND DISCUSSIONS BEFORE THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

At Its Eighteenth Annual Meeting Held at Chattanooga, Tennessee, October 27, 28, 29, 1913.

(Continued.)

He said that ocular discomfort caused by artificial light is not directly, as by ultra-violet rays, infra-red and the like, but indirectly, through the three-fold adjusting mechanism of the eye, which includes adjustment for intensity which is relatively unimportant; adjustment for focus, and adjustment for fixation, both of the latter very important, as is the case with other forms of eye-strain.

Quantity of light is important, but very well understood and controlled easily. Quality, or wave length is of importance esthetically and on grounds of efficiency, but has not been proved of importance as a factor in causing eye-strain. Under distribution, in this connection, are included direction, intrinsic brilliancy, diffuseness, shadows, flicker. Under direction is emphasized the statement that no brilliant light source should be located so that it is visible—that is, shines into the eye when looking in the usual directions. A light shining into the eye from down is the worst. Light should not come from such a direction as to cause glare by reflection from paper or work. It should not be so located as to cause troublesome shadows, as in writing, the hand should not shade the point of the pen.

It makes a great difference whether the amount of light in a room comes from a small source of great intensity, as a bare arc, or a large source of low intrinsic brilliancy, as a large window by daylight, or a brightly lighted ceiling by the indirect method. Diffuse light, the opposite of direct light, comes from many directions instead of one, and makes a lower general illumination suffice for good, comfortable seeing. This is done by indirect lighting of various forms, using the ceiling or walls, for example, as the source. While the pathologist may state there are no visible changes in the retina to be detected from exposure to intense sources of light, yet one must consider that exposure night after night to such sources of high intrinsic brilliancy may so reduce the resistance of the tissues as to make them more vulnerable to other damaging agents. And the tax on the adjusting mechanism of the eye causes eye-strain, which, though unaccompanied by any histological changes, is none the less an important thing for ophthalmologists to consider.

All writers on the subject agree that the censation of pain as well as the tired, blurry feelings are of muscular origin, that is, have their source in the intra- or extra-ocular muscles. There is no general agreement as to how the other symptoms are produced. It is evident their seat is in the conjuctiva and most of the cases can be explained on the basis of hyperaemia of the conjunctiva.

Attention was called to the striking similarity of symptoms arising from eye-strain due to faulty illumination to the symptoms of eye-strain arising from working with uncorrected errors of refraction, and here is certainly a hint to look for the related cause. The suggestion is obvious that the way faulty illumination affects the eye is through the mechanism of adjustment for intensity of light. The periphery of the retina lacks the mechanism of adjustment, and here is a clue to the discomfort of a strong light falling obliquely on the eye. The dark adapted area being exposed to strong light there ensues a hyperemia of the retina and choroid, and if the process continues there follows a hyperaemia of the conjunctiva and of other parts of the eye. Hyperaemia of the conjunctiva will explain the symptoms of its group, hyperaemia of the ciliary region will throw light on the other group.

Any fault of illumination results in producing unsatisfactory retinal images, with increased effort on the part of the eye to secure bettter images, and these efforts mean whipping up the ciliary muscle, the fixation muscle and the iris to more satisfactory adjustments, and as a result they are fatigued.

In patients whom one tries in vain to relieve of symptoms which point unmistakably to eye-strain and whose refractions have been gone over with the greatest care, before ordering a rest as the only resource left, it would be well to look into the conditions of lighting under which they work, and not to hesitate to advise improved methods of lighting.

Dr. Robert Lamb, of Washington, D. C., opened the discussion, saying that the first duty of ophthalmologists in this regard should be to convince engineers and architects of the economy in factories and in buildings generally of an illumination that will bring about the best interests of the operators and best facilitate their work. In his experience he did not think the color of the light was of much importance as compared with the intensity, and the direction. He said there were undoubtedly more cases of retinitis and choroiditis than one was apt to believe, as many cases get well by going for a vacation. The diffusion and distribution of light have been taken up more thoroughly by manufacturers of lamps and illuminating engineers of late and the ophthalmologists should do all in their power to help them. In the arrangement of rooms contrasts should be studied, the arrangement of light and shade, the painting of the walls in softer colors and the harmonizing of the furniture to the walls.

Dr. Park Lewis said the illuminating engineers are quite desirous of cooperating with the ophthalmologists in the study of this large question and he hoped arrangements might be made whereby the two might work together, as the former have opportunities for laboratory study and making spectroscopic tests and examinations, and by supplying the knowledge they lack as to the pathological conditions much good may be accomplished.

Dr. Moulton, of Ft. Worth, said that every case of asthenopia which came to him he investigated as to the direction of the light, especially in those who work with the pen or needle, and frequently find it comes from the wrong direction. W these he makes a demonstration of the relative value of writing with the light from the right and then from the left side, and this practical demonstration will make them understand.

Dr. Harry Gradle, of Chicago, said that while he considered the indirect method the ideal illumination for general purposes, he found the eye tired more quickly in reading with it, and there was complaint in working on white work with white thread. This he thought due to the lack of shadows and due to the difference in size of pupils, and the difference in the amount of light entering the eye. People with incipient cataract find it almost impossible to read by indirect illumination.

Dr. Reber said he thought the greatest point of interest in the paper was that it brought out the social relation of the ophthalmologist to the community, the relation he is entering into more fully from year to year. The best possible light should be produced consistent with the efficiency of the eye. But in the attempt to do this the mark has been overshot and too much light is often supplied. Ophthalmologists have not yet settled, nor have the illuminating engineers for them, which is the best: the direct, the semi-indirect and the full indirect illumination. Dr. Ives, who is working in the laboratory in Philadelphia, has his room lighted with what he calls artificial daylight and will show this later on. Instead of being illuminated from above, so that the light falls on the lower part of the retina, he has used sidge lights as they are used during the day.

Dr. Tuckerman, of Cleveland, said the reason the indirect lighting for most purposes is best is that the light reflected from the ceiling or side walls is diffused, and a rough surface is used to make the light diffuse and not give a mirror effect. Dr. Tuckerman said that all ophthalmologists should go out and fight against the red lights and whirligigs of electricity that are used as advertising of late and which are so trying to the eyes.

Dr. Lancaster, closing the discussion, said there were three means of approaching the problems presented: one is to consider the etiological reasons why one system of lighting should be better than another; this is unreliable. The second is the concensus of views of a great many who have tried different methods: enough evidence would be reliable. For instance, while one spoke of indirect lighting being unsuitable for reading, hundreds of statements on the other side could be easily cited. In cases where it has failed, it is probable there is some other factor, as insufficient intensity. The third way is by laboratory experiment. In this way it was found that a falling off in vision after three hours was not greater than in daylight where indirect illumination was employed, while in the direct or semi-direct light the falling off was 50 per cent. This would be overwhelming evidence.

Psychic Disturbances Involving the Eye.

In a paper on "Psychic Disturbances Involving the Eye," Dr. F. Park Lewis, of Buffalo, said that functional disturbances of the eyes having a hysterical basis may include those having an exaggerated or diminished functional activity. They include the hyperaesthesias as well as the anaesthesias. Illustrative cases were given including functional ambloypia, blepharospasm, artificial ulcer, ocular neuralgia and asthenopia.

Sometimes these have their origin in definite pathological lesions, as in hypertrophies of the tissues within the nose. Tonic and clonic convulsions may exist as eye reflexes. The importance was emphasized of a recognition of the modification of sensibility in the ocular region as an associated and diagnostic symptom as well as that of hyperaesthesia. The hysterogenic zones, the prodromae and sequalae of an attack were considered. The inversion of the visual field for colors was noted. Hysteric ophthalmia migranies were discussed, with a study of the migrainogenic zones in and about the eye.

In the discussion, Dr. Disley said one must bear in mind that there is a difference between the psychic case and the sinning case,—the malingerer, and cited several cases of both types.

Dr. Green said in that class of patients, hardly to be classed as hysterics or neurasthenics, but who are obsessed with the idea that they cannot use eyes for long periods, even after the most careful refraction, it is well to gain the cooperation of the patient and interest him in his own case by getting him to read a certain length of time on the first day, a little more on the second, and so on, keeping a careful record himself of his accomplishment, and in this way the obsession gradually disappears.

Dr. Donovan, of Butte, Mont., said the worst thing the physician can do is to let these people get away and fall into the hands of Chritsian Scientists and such, who teach them the negative condition of nature. In the control of the psychic portion of the human being, the thing to deal most with is anger. Under this come ill temper, irritation, peevishness, revenge, indignation, etc. Of almost equal moment is fear, with its many divisions such as despondency, anxiety, etc. In all these cases the ophthalmologist has to deal with the people are more or less subject to some of these conditions and in looking into their history we will find the evidence. The simple shyness of the child, if allowed to develop, will later lead to the destruction of every independent psychical force.

Dr. Lewis, closing the discussion, said that even in those instances where there is definite shamming the psychic element enters to a degree, and one must determine the degree he is shamming to deceive others and the degree he is deceiving himself. The purpose of bringing the subject up was to emphasize the necessity of recognizing this phase of the subject in practically all cases.

Report of Twenty Cases of Trephining for Glaucoma; An Inquiry Regarding Increased Tension of the Eyeball; The Use of Pilocarpine and Eserine in Diseases of the Eye.

"Twenty Cases of Trephining for Glaucoma," by Dr. Nils Remmen, of Chicago; *"The Elliott Trephining Operation for Glaucoma,"* by Dr. Wendell Reber of Philadelphia; *"An Inquiry Regarding Increased Tension of the Eyeball,"* by Dr. S. D. Risley, of Philadelphia; and *"The Use of Pilocarpine and Eserine in Diseases of the Eye,"* by Dr. Robert Scott Lamb, of Washington, D. C.

Dr. Remmen said that trephining as a treatment for glaucoma is still a new subject, and what is known about it has been received principally from a very few men who have had a great experience with it. Some surgeons are a little timid about trying this operation and he had thought it might be encouraging to them to hear of the experience of one who is more of a beginner in trephining. He uses the Sydney Stephenson trephine, diameter 2 mm. in most cases, these being both clean and sharp, and he has confined himself to the Elliott operation. Infection did not occur in any of his cases: the redness and pain which occasionally supervened was relieved by a laxative, atropin and sometimes aspirin. In no case where vision was present before the operation was it lost after the operation. Tension went down in a satisfactory way. He thought that if trephining is better than iridectomy in the later stages of glaucoma, it should also be better in the beginning, when the blood vessels and other tissues of the eye are in a healthier state. Glaucoma is too high intraocular tension, plus its cause and effect, and this, without treatment, destroys vision sooner or later. Iridectomy only saves about 50 per cent. Iridencleisis was an improvement, reducing tension in a greater number of cases. Trephining is the simplest of all the glaucoma operations, being almost like opening a little abscess. The importance of trephining forward into the cornea is soon learned, as is the importance of the large conjunctival flap, which should be as thick as possible, care being taken not to injure this flap.

Dr. Reber, assuming that the surgeon has decided in a given case of glaucoma that operation is indicated, said his choice will lie between the classic iridectomy of von Graefe and one of the filtration operations. For iridectomy may be claimed its ease of execution, the short duration of the operation, the prompt closure of the wound, leading to lessened liability to infection, freedom from complications in the healing, and permanency of result. Against iridectomy are the complications: transfixation or engagement of the iris: widespread separation of the root of the iris; partial or complete dislocation of the lens; intraocular hemorrhage at the time of operation or almost immediately following it; unruly patient.

For the Elliott trephining operation it can be claimed that it is relatively easy of performance, less risky than von Graefe's or La Grange's method, and reasonably promising of improvement or cure in both acute and chronic glaucoma.

Dr. Reber reported 26 cases of trephining he has performed, all under local anaesthesia, from which experience he gleaned the following lessons: He now approaches a glaucomatous eye from the surgical standpoint with a hopefulness he had never enjoyed up to this time. That while the operation is much more tedious and less brilliant than iridectomy, he believes sclerotomy to be the safer operation. A longer post-operative reaction is to be expected after trephining than after iridectomy, which is due to the presence of the lymph from the anterior chamber, which at first acts almost like a foreign substance (perhaps a biochemical reaction). As pointed out by Col. Elliott, "quiet iritis" is not infrequent, and the use of atropin in the eye from the second or third day onward for ten or twelve days is beneficial. Dr. Reber believes that two to four weeks preliminary eliminative treatment will often forestall this sequence. A large flap affords the best chance for subconjunctival filtration. If the conjunctival tissues are found to be thick and infiltrated, it is wise to use a stitch. Once the scissors have carried the flap down to or near the limbus, the flap should not be held with the forceps, but with some cotton wrapper on a wooden applicator, which also supplies a mop in the operator's left hand, ready for use. A clean, sharp cut through the sclera is a great disideratum, and Dr. Reber thinks this is best accomplished by a mechanically rotated trephine. To that end he has had made some straight, tubular trephines that are easily slipped into the catch of the ordinary dental engine with its flexible shaft, which have served the purpose beautifully, the only objection being that the engine cannot be carried in the bag to the home or the hospital. He is having made a small flexible shaft attached to an 8 oz. motor that can be driven by an ordinary dry battery. The conjunctival layer of the cornea can hardly be split off too far forward to facilitate accurate placement of the trephine. Descemet's membrane must be cut through if possible. A 2mm. trephine has proven more serviceable in Dr. Reber's hands, contrary to Elliott's experience. Seeing that the glaucomatous eye is almost always a vascularly degenerated eye, intraocular hemorrhage will occur in a certain percentage of cases, but in the presence of trephining this is a negligable factor so far as the integrity of the eyeball is concerned. Trephining may be done almost always under local anaesthesia, but if general anaesthesia is necessary, it does not invite the disaster caused by post operative vomiting as in von Graefe's operation.

Dr. Risley, after presenting a careful study of the causes of glaucoma, and giving case histories, concluded that glaucoma must be regarded as a convenient appellation for ocular manifestations or expressions on the one hand of a general or endogenous infection or toxemia: on the other an exogenous or local infection. The treatment must be addressed to the etiological factors which, if recognized early, hold out the hope of prevention. Failing this, operation is designed to ward off temporarily the sequellae of increased intraocular tension.

Dr. Lamb called attention to a new use of pilocarpine and eserine, investigation of which had started in a desire to know if their use in glaucoma was not attended with something besides myosis, such as contraction of the capillaries or some analgesic effect: the consideration leading him to the hypothesis that either drug could be used to give tone to the circulation in and about the eye in some such manner as would be done by revulsion in hydrotherapy. Pilocarpine was used in nutritional disturbances of the eye, not neglecting other local measures and treatment of general systemic conditions. He has found in many cases of migraine, some using prisms and some where muscles had received marked attention, and where correct lenses had not relieved, that eserine had been of marked benefit. In patients whose eyes anatomically or because of gout, are predisposed to glaucoma and where there is a family history of glaucoma, this treatment had been effective in relieving the symptoms of the prodromal or remission period, and so far, none in the remission stage has come to an acute attack.

In the *discussion*, Dr. Thomas Faith, of Chicago, said that while his experience had been limited to seven cases, using the Gradle trephine in most of them, the operation appealed to him as simpler than iridectomy. There was no pain at the time of the operation or subsequently.

Dr. Greenwood, of Boston, said a tremendous debt of gratitude is owed to Colonel Elliott for having given the profession the safest operation for the production of a fistulous cicatrix in glaucoma, and to LeGrange for having demonstrated it was possible to make such a cicatrix.

The use of pilocaroine or eserine, or both has not been as frequent as it should have been, especially in cases where, while no actual evidence of glaucoma is present, by some intuition it is felt it may at some time be precipitated. In such patients the relief from the discomforts of eye-strain by the use every night of a weak solution of pilocarpine (1/10%) is very great.

Dr. Bannister, of Omaha, referring to Dr. Risley's paper, said he had been led into the same line of thought through his interest in autointoxication. Defective metabolism is now taking an important place in conditions everywhere in the body, and it is realized that there are several sources of this intoxication. Its great effect is upon the blood vessels, and it has been proven by late investigators that the blood vessels of the ciliary body are especially prone to such evidence of disease in glaucoma, so there can be a decided connection between the toxines of the blood and their action upon the delicate uveal tissues of the body. Something in the line of autointoxication must be looked for as one of the great causes of glaucoma.

Dr. Jackson said that, realizing the connection to underlying tissue, he has endeavored to get a conjunctival flap by a single slightly curved incision, about 8 to 10 mm. from the corneal margins, and pulling it down with a broad ended forceps. A suture is not needed. The importance of getting rid of all loose tissue must be appreciated. Dr. Jackson said he certainly felt less anxiety in doing the trephine operation than in iridectomy, although he has not given the latter up in cases where it has served him so admirably in acute exacerbations of glaucoma.

Dr. Harry Gradle, of Chicago, said he was optimistic enough to believe that the time will come when glaucoma will be treated and cured on an etiological basis: the trephining operation of Elliott's is the best bridge yet built from the pre-Graefian period. One of the unfavorable aspects of iridectomy as compared with trephining is the visual results, which are worse in loss of accommodation, etc. One thing against the operation is that there may be, months or years after, the late infection, where a purulent organism enters through the scar into the globe with resulting panophthalmitis. To avoid this the flap must be purely conjunctival.

In glaucoma where the eyesight has been destroyed before operation, a quiet iritis that can be controlled is rather favorable, as it lowers the tension and keeps it down.

In glaucoma simplex, where the curve of intraocular tension shows it can be controlled by mydriatics, surgical procedure must be resorted to, but Dr. Gradle prefers a cyclodyalisis first, as it is a minor operation and succeeds in controlling the pressure in quite 50 per cent of these cases. The result will be known in a short time, and if necessary may be followed by trephining, which is a more serious operation.

Colonel Elliott was requested to say what he does in those cases following iridectomy where the anterior chamber is not restored, where the iris comes forward against the posterior surface of the cornea.

Dr. F. D. Calhoun, of Atlanta, said he had been quite anxious about the restoration of the anterior chamber, until on reading Elliott's book he noted it was there stated that it would eventually be restored, and his experience had confirmed this.

Dr. Lancaster asked why Elliott does not trephine in glaucoma after cataract.

Dr. F. Park Lewis asked what changes Colonel Elliott and Dr. Risley had observed in the lens in those cases in which there succeeds a beginning opacity after iridectomy and after trephining.

Dr. Joseph Lichtenberg, of Kansas City, reported twelve operations on glaucoma by trephining, and an improvement in technique since seeing Colonel Elliott work, especially in the discovery that the trephine may be directly over the site of an old coloboma. As to the effect of eserin and pilocarpine the later on iritis and the former on the ciliary body, each must be studied and the remedy proportioned in accordance with the reaction on the patient, and not by any standard formula.

Dr. Charles Stuart, of Cleveland, suggested that the dental engine used in connection with trephining might be arranged with plug to attach to ordinary electric light fixtures.

Dr. John McReynolds said the flap of Elliott was practically perfect. He uses a pair of blunt forceps which will not bite off the fragile conjunctiva, but with which he is able to hold it in position and regulate it at all times. Dr. McReynolds, exhibited an instrument whose object was to more successfully split the cornea, it being sharp only at the point; with it one can gain access to as much as 2 mm. of corneal tissue for the introduction of trephine. As a substitute operation, when a trephine is not at hand, a curved needle may be used with thread, directing it up and tying the thread, the flap having first been made according to Elliott. Then with a sharp knife the portion drawn through can be excised. The result is the same, and it is done with instruments with which all are familiar.

Closing the discussion, Dr. Reber, said there was no question but there will be more astigmatism after iridectomy. He would not agree with Dr. Gradle in doing two operations in chronic simple glaucoma. When the anterior chamber is punctured the character of the aqueous is changed. It becomes cloudy and may impair the nutrition of the lens, but this is seen after a plain iridectomy, although only for 36 to 48 hours, while after trephining it goes on for three weeks. In a chronic simple glaucoma, in the presence of a vision that holds, Dr. Reber would hold to general metabolism and medication. The remarks of Dr. Lamb in regard to pilocarpine and eserin were endorsed, and in old corneal ulcer that does not behave well one may resort to the tonic use of pilocarpine.

Dr. Lamb called attention to these drugs in many diseases of the eye to increase and improve the circulation.

Dr. Risley said he had never experienced any of the terror which he had heard of for so many years in regard to iridectomy, and the distasters which are said to follow it were foreign to his experience. After a properly performed iridectomy the opacity of the lens is less likely to occur than though the iridectomy had not been performed. Eserin does good because it carried on the blood stream through the contracted vessels of the uveal tract.

Lieut. Col. Elliott, invited to close the discussion, referring to what had been said as to the case of execution in iridectomy, said it had been his lot to teach a large number of men to operate on the living, and he would say without hesitation that the man who can do an iridectomy well and neatly is a thorough operator and needs nothing be taught him. It is the most difficult operation possible, an for this reason he always protects the keratome knife.

The presentation of the lens may occur in any glaucoma operation and in Madras is largely due to the relaxation of the zonulé and consequent shifting of the lens.

The interval for the filling of the chamber is because it takes the flap a little time to fix firmly down and shut off the channels for the removal of the fluid.

As to optical results, cases were cited where iridectomy had been done first on one eye, and trephining on the other, with very much better results in the latter case.

While trephining has been on trial only three or four years, those cases seen frequently show no tendency to change. It is urged to trephine for chronic cases and for congestive cases. It is the simplest of operations, always with the proviso that no operation is going to give 100 per cent of success in acute glaucoma. The danger of intraocular hemorrhage is greater in sightless eyes with glaucoma. When it occurs the patient should be put back to bed as quickly as possible.

As to the use of drugs, while advocated by surgeons of world-wide reputation, Colonel Elliott said his feeling was all the other way. The operation of trephining in an early case is so easy, so simple, so safe and so certain that one need not hesitate to advocate it in all cases. Many of the unfavorable results are due to the omission to make the large flap. The speaker believed there is a greater tendency for iris prolapse where the mechanical engine is used. He has advocated from the beginning that one should get far away from the ciliary body. If a dental engine is used the trephine hole should be made smaller at first.

It is advised to trephine over the area of the old iridectomy so as to get rid of iris complications. Excellent results have been obtained in the prevention and relief of pain. Atropine had been mentioned for relief of pain, but Colonel Elliott preferred eserine. Trephining may be repeated many times. Colonel Elliott expressed himself as paralyzed with the magnificent ingenuity of instruments shown for the operation, and asked that all possessing such should send descriptions and sketches to his London address to be incorporated in his book. The thing aimed at in trephining is a foreign body free fistula. The reasons for the opacity must be left for the etiologist to throw light on, and it is up to the young men to work out these problems. Quiet iritis should be carefully watched, and should be suspected in every case. There is no fear provided there is filtration. Atropine may be poured into the eye, and not stopped until it is sure the iritis is over. All were urged to publish their findings whether successes or failures.

Dr. Allen Greenwood, of Boston, in a paper entitled, "Enucleation with Glass or Gold Ball Implantation," said that all patients are desirous of obtaining the best possible cosmetic effect following an enucleation, and in no way can this be obtained so well as by the implanation of a large sized glass or gold sphere in Tenon's capsule. If a sphere of from 18 to 22 or even 24 mm. is used it is much more likely to be retained, and if Tenon's capsule is sewed over the sphere carefully and separately from the sewing together of the muscles, retention of the sphere is almost absolutely sure. Following such an operation there is no appreciable sinking in of the upper lid, and with a properly fitted artificial eye there is greater movement imparted to it, the cosmetic effect being thereby enhanced.

Dr. Reber, who opened the discussion, said that when it is considered that the size of the normal eyeball is 25 mm., one need not be taken aback by the size of the globes used by Dr. Greenwood. The cosmetic effect is better, and the upper lid can better be maintained at the level of the other eye. Rotation is good.

Dr. Jones, of Cumberland, said that realizing that in implanation a certain kind of glass was required, he had thought that agate, being so resistent to all kinds of chemical action, might be a good substitute.

Dr. Lancaster said that when the operation is done aseptically there is little reaction, and with the large ball there is no sinking in, as when a small ball is used.

Col. Elliott cited a case of a boy who had the misfortune to break a glass ball which had been implanted.

Dr. Greenwood replied that with regard to the use of agate, he would prefer to use something as light as possible. In no other method has he been able to secure such good outward rotation.

Dr. F. P. Calhoun, of Atlanta, Ga., recorded three cases of bilateral coloboma of the lens, which he stated was a comparatively rare abnormality and often undiagnosed. He recited the theories as to the cause of coloboma.

Discussing the paper, Dr. Reber said he had under his observation three cases of this fairly rare condition. The etiology is not clear. There seems to be a disposition to return to the theory that it is due to arrest of development. It has been observed that congenitally abnormal eyes do not heal as kindly as do the normal eyes.

Dr. Gradle called attention to the notching at the edge of the lens, which is not seen without absolute dilatation and which is destroyed if the lens is removed without the capsule. He believes the most probable cause of coloboma of the lens is a short-circuiting of the embryonic vascular system of the lens. He thought if the eyes of infants could be examined with the maximum dilatation it would be seen much more frequently than now.

ROYAL SOCIETY OF MEDICINE.
SECTION OF OPHTHALMOLOGY.

A meeting of this section was held on Wednesday, November 5th, 1913, Sir Anderson Critchett, Bart, F. R. C. S. president of the section, in the chair.

Mr. Sydney Stephenson showed a case of brawny scleritis at an early stage, which Mr. Treacher Collins thought was a tenonitis. He had had a case of this condition, which persisted for a long time, as had this one. Mr. Holmes Spicer reminded the meeting of a case with a similar appearance which he showed at a former meeting, under the title "solid oedema of the conjunctiva." That, however, had a syphilitic origin, which, apparently, was not the case here. Dr. Deighton Davies spoke of a case under his care with a similar appearance. A small portion examined showed round cells without a stroma. He enucleated, and on bisecting the globe, found a darkly pigmented sarcoma. He suggested the present case was sarcoma.

Mr. J. L. Barley showed a case of keratitis punctata, and Mr. Killick one of persistent hyaloid artery.

Mr. A. S. Cobbledick showed an example of ectasia of the cornea four years after a perforating wound; and a case of rupture of the choroid in a myope following labour. The latter case he regarded as unique.

Mr. Bishop Harman showed a patient with new growth causing detachment; and Mr. George Coats exhibited a dog with keratitis. Mr. Chatterton showed a case of tubercular iritis, in order to elicit opinions as to the value of tuberculin injections for the condition. Mr. Browning said he had treated a number of such cases with tuberculin, and he knew of no case in which hæmorrhage had followed its use. The French believed the hæmorrhages which occurred were of tubercular origin. Mr. Mayou stated that he had treated numerous cases of tubercular iritis with tuberculin, and had not seen hæmorrhages during the treatment; there was absorption of the nodules, and subsidence of the iritis. It was the most successful treatment. He commenced with 1/10,000th, and worked up to 1/250th T. R. Where there was lung trouble also, a very small dose caused severe reaction, and it should be given very cautiously. Mr. Macnab said he had recently treated two cases in this way and both did very well. Mr. Arnold Lawson gave confirmatory experience.

Mr. Parsons showed a central unilateral retinitis, and Mr. Hugh Thompson a case of choroiditis starting as a ring round the macula.

The late Mr. Nettleship, F. R. C. S.

The President made sympathetic reference to the death of Mr. Edward Nettleship, which was a loss not only to the Society, but to the world of ophthalmology. Though evidently in failing health, his mental vigor was such that he took part in the discussions at the recent Congress of Medicine. The speaker's father and Mr. Bowman had the highest opinion of Mr. Nettleship's pathological knowledge in the early days, and that opinion had been amply justified since. A resolution of condolence with his relatives was carried by members upstanding.

Mr. G. Coats read a paper in which he reported some examples of disease in the animal eye. He described a form of keratitis characterized by the presence of a superficial vascular opacity of the cornea. The disease was of long duration and had no evident accosiation with distemper or other general illness. It sometimes occurred in more than one member of the same litter. Pathologically, it consisted in a replacement of the superficial layers of the cornea by a layer of inflammatory tissue. The human condition which it most nearly resembled was trachomatous pannus, but it differed from that disease in the absence of follicles, and of scarring or distortion of the lid, as well as by its not being confined to the upper part of the cornea. A case of retinal degeneration following distemper was described. The retinal changes were peculiar in that it was the bipolar cells of the inner nuclear layer which were chiefly affected, the ganglion cells showing only slight, and probably secondary, changes, the outer layers being mostly intact. In places, however, the rods and cones and their nuclei were also atrophied. These changes were probably to be explained by the presence of a circulating toxine with a specific affinity for the retinal bi-polars, analagous to the specific action of nicotine on the ganglion cells.

A description of some cases of choroido-retinal degeneration and inflammation was prefaced by a discussion of the pathological points of distinction between these two conditions. A profound atrophy of the retina without adhesion to the choroid must be a degeneration. In old-standing cases of degeneration, however, an adhesion between the two membranes occurred, but it was usually not very intimate: the line of demarcation remained well defined, and the elastic lamina of the choroid was intact. The occurrence of cicatricial tissue was certain proof of precedent inflammation, and where it was present the adhesion was dense and the layers of the choroid and retina were distorted and disorganized, instead of being merely atrophic. A degeneration was often fairly uniform over a considerable area, an inflammation was patchy.

Examples of choridal-retinal degeneration in a dog, raccoon, wolf, wild sheep, ferret, wallaby and hyæna were shown. The raccoon appeared to be an albino, yet a little pigment was present in the epithelium of the ciliary body and anterior part of the choroid, showing that pure albinism could not be diagnosed without a microscopical examination. The raccoon also showed nystagmus, a condition occasionally described in the lower animals. A case of choroiditis, cyclitis and keratitis in a bear, and one of anterior choroiditis in a peccary were also illustrated.

Two instances of canine irido-cyclitis were reported. The first was of plastic type, and was peculiar only in its occurrence in the dog, in which animal the condition appeared to be rare; the second, also in a dog, was characterized by an enormous thickening of the iris, due to infiltration with mononuclear cells of a special type. Posterior synechiae and other features of plastic iritis were absent. The cause of the irido-cyclitis was obscure in both instances.

The paper was discussed by Mr. Treacher Collins, Mr. Lawford, Mr. Sewell (veterinary surgeon), Mr. Rayner Batten, Mr. Bishop Harman, Mr. Holmes Spicer, Mr. Lang, Mr. Cruise, and the President, and Mr. Coats replied.

Mr. Charles Wray read a paper on Obstruction of the Lacrymal Duct and its Treatment. He believed it was a mistake to remove the sac when syringing failed, without attempting to cure by means of styles, or styles and probing combined, and thought it was not unlikely that ectropion and its sequellae might follow excision. Too much was heard of the satisfactory and immediate results, but too little of bad ones and of recurrences. After referring to the danger of adrenaline and chloroform when used at the same time, stress was laid on Harrison Butler's operation. According to the author, all cases of epiphora should be rhinoscoped, though he admitted he had received little or no help from the rhinologist. The author treated his cases in the following way. He injected cocaine by Mellen's method, and instilled a drop into the conjunctival sac. A Bowman's probe was then passed into the sac, and the point pushed forward under the palpebral ligament. He then cut down on the guide, taking care to note the click of the knife on the probe. So far, the procedure was quite painless. He then placed crystals of novocaine in the sac, and had recourse to probing. At times, if the stricture was impermeable, he forced a passage through the posterior wall of the duct. A piece of strapping was then placed just below the sac, so that the style did not press on the skin. A special style—gold-plated and obtainable from Courlander of Croydon, —was then passed, and the latter was so constructed that when a piece of strapping was placed on its arms it could not move.

Whilst it was *in situ,* argyrol 5% was used three times a day, or such other application as might be desirable. Later, when a firm-edged fistula had formed, the patient was instructed to irrigate the sac three times a day, passing the style at night, and taking it out in the morning. To cure the fistula it could be dilated and whilst stretched, all the cicatricial tissue cut away, after which the edges of the wound were brought together and covered with collodion. He proceeded to criticise the operations of Toti, Eichen and West. The first of these consisted in making a large open window between the sac and the nose, and as the nose in cases of lacrymal obstruction was so very often diseased, the operation, in his judgment, could scarcely receive the approval of ophthalmic surgeons. And the patient experienced considerable annoyance on blowing his nose, and the operation provided no vertical tube like the duct to carry a flow of tears opposed to the entry of organisms to the sac.

Eichen sidetracked the tears to the antrum, *i. e.* converted this cavity into a pool of stagnant tears. It also had the same objections as those urged against Toti's operation.

West's operation was for obstruction low down in the duct, and consisted in removing its nasal wall. It was better than the two foregoing operations, as some of the duct was left, but it had the serious objection that autolavage and autoprobing were impossible. The aim of the operation was to make a permanent fistula in the middle meatus, but the task of making one in erectile or semi-erectile tissue in a canal the size of a crow-quill was almost impossible; but in the event of the duct being kept open by constant probing *via* the nose, or canaliculus, the erectile tissue would be so damaged that a fibroid stricture would be bound to follow. He said his object was not so much to attract attention to his own operation as to obtain a formal expression of opinion as to the value of the newer operations of Toti, West, and Eichen.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of October 18th, 1913.

DR. G. F. LIBBY, PRESIDING.

Corneal Laceration Without Injury to Lens.

Dr. W. C. Bane presented a woman of 49 years who had severely lacerated the left cornea by striking her head against a chair. The ocular injury was apparently directly due to a broken spectacle lens. The cut extended right across the cornea and about 4 mm. into the sclera. Torn and protruding iris had been excised and a superficial stitch inserted at the sclero-corneal junction. Rather slow healing had been hastened by touching the margins of the corneal wound with 20% solution of nitric acid, and by curetting. The lens had not been injured, and vision was now, two months after the accident, 1/50.

DISCUSSION. Dr. Black recalled a case in which a blow from a ball through a spectacle lens had practically excised the whole iris, without injury to the crystalline lens. The eye had given no trouble in the course of a number of years.

Dr. Walker thought that the insertion of the suture at the sclero-corneal junction had prevented incarceration of the ciliary body in the wound, and so safeguarded against sympathetic disturbance.

Dr. Coover referred to a case in which a spectacle lens had been forced completely within the orbit by collision with a wagon tongue.

Scleral Ectasia.

Dr. W. A. Sedwick presented a child of nine years whose right eyeball was extremely and generally distended. The history was vague but pointed to a probable ophthalmia neonatorum. The cornea was represented by a reddish area. The uveal color showed through the sclera to a marked degree. Should the eyeball be removed at the present time? The child was suffering no discomfort.

DISCUSSION. The consensus of opinion was in favor of removing the eyeball without further delay. Dr. Black would insert a paraffin ball in Tenon's capsule.

Optic Atrophy.

Dr. Edward Jackson presented a house painter of 53 years, who had noticed marked failure of vision of the right eye since July last. He had a positive luetic history dating back twenty years and a Wassermann test recently made had been strongly positive. The retinal vessels of the affected eye showed marked obscuration, narrowing, and kinking of the veins at their crossings, these conditions being less pronounced in the left eye. In the right eye the blood column of the lower temporal artery was hidden for one half disc diameter near the edge of the disc, and the other arteries were narrowed and light in color. The right disc was dull white, and hazy. The left disc was normal. The pupils reacted slightly to light thrown on the right, strongly to light thrown on the left eye. The right eye saw shadows, the left 4/4. The urine was normal.

DISCUSSION. Dr. Black thought that the eye was passing from the stage of edema to complete atrophy of the optic nerve. The retinal vessels did not yield at all to pressure on the globe, indicating advanced arteriosclerosis.

Dr. Walker favored examination as regards the nasal sinuses in any such case.

Dr. Ringle referred to a case in which one eye had had very poor vision for several years from optic atrophy, and in which marked improvement followed the use of mercury and potassium iodide.

Symmetrical Bilateral Cornea Opacity.

Dr. G. F. Libby again exhibited the patient shown on October 21st, 1911, on account of symmetrical bilateral opacity of the cornea. For a long time he had thought the growths stationary or nearly so, but he could state definitely that the right opacity had now increased from 4 by 4½ to 5 by 6, and the left from 4½ by 5 to 6 by 6½ m.m. The patient asserted very positively that the disturbance had started as crescentic opacities in the nasal quadrant. The patient had had a miscarriage twelve years ago and almost a year ago had borne a child which died from inanition; but mixed treatment had failed to improve the ocular condition. Could the case be benefited by operation?

DISCUSSION. Dr. Black was in favor of experimentally raising one side of one of the opacities to ascertain its depth. If thin he would attempt removal of the opaque tissue.

William H. Crisp, *Secretary*.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

A regular meeting was held Monday evening, October 20, 1913, with the President, Dr. Willis O. Nance in the chair.

Sporotrichosis of the Conjunctiva.

Dr. William H. Wilder reported the following case: C. P. M. a student had been working in the laboratory with cultures of various strains of sporothrix, and on several occasions small capillary pipettes containing emulsion of the organism were broken at a distance of eight or ten inches from the face.

On the evening of July 10, 1913 he noticed a soreness of both eyes, together with photophobia and a sensation as if a foreign body was under the lids. The following morning the lids were slightly swollen, the pain was increased and the surrounding lymph glands were quite tender on pressure.

July 11th, the general condition was good. There was no fever. Leucocyte count was 9,000. The pain, swelling of the eyelids and photophobia increased. The conjunctiva of the eye lids of both eyes was reddened and so swollen that the fornix rolled out in a mass when the lower lids were everted. In addition there were present on the palpebral conjunctiva and also on top of the fornices several grayish, yellow, slightly elevated spots varying in size from 0.5 m.m. to 2 m.m. in diameter from some of which the covering epithelium had been cast off so that they seemed like small yellow ulcers. Numerous follicles presented in other portions of the conjunctiva. The secretion was rather scanty, and an examination of a smear made from gentle scraping over the spots and conjunctiva, stained with alkaline methyl-blue showed no organisms, but numerous pus cells. The next day scrapings were taken from the shallow ulcers and aerobic and anerobic cultures were made. Potassium iodid, 10 grains, three times daily. The eyes were washed out several times daily with a solution of oxycyanid of mercury, 1-4,000.

July 16, the condition not improved, swelling of the preauricular glands which were painful on pressure. Because of discomfort from the irrigation the strength of the solution of oxycyanid was reduced to 1-6,000. No growth in the tubes which were placed at room temperature (18 to 20 degrees C.)

July 17, the condition of the lids was no better; there were more yellowish spots seen forming in the conjunctiva. The patient seemed quite sick and had a temperature of 100½° F. The preauricular, anterior cervical, submaxillary and post auricular glands were somewhat swollen and painful on pressure. The small ulcerated spots on the conjunctiva were treated with tincture of iodin.

July 18, the general condition was worse; headache; malaise, temperature 101°, leucocyte count 18,000. Sporothrix growing in the tubes and spores found in the scrapings from the conjunctiva.

July 19, general condition worse and patient went to bed, temperature 102°; leucocytes 14,600.

During the night a sudden pain occurred in the left knee on the internal side of the upper end of the tibia: in the morning the limb was very sore, painful on pressure or motion but without swelling or redness. On application of ice bag after twelve hours this pain disappeared. The swelling of the conjunctiva was somewhat less, and no new spots had appeared. Iodid increased to 20 grains three times daily.

July 20, temperature 99° in the morning; rose gradually to 101.4° in the afternoon. The ulcers in the conjunctiva healing.

July 21, in the morning there was a pain in the left elbow and wrist and lower end of the right femur, which was very sharp, especially on motion and pressure; temperature 100.6° in the afternoon.

July 22, pains still persistent: temperature 101° in the afternoon: conjunctiva much improved: ulcers healed.

July 23, in the morning all the pain had disappeared except in the left wrist. During the night severe pains in the right knee around the head of the tibia and also in the right ankle. Temperature 100.3° in the afternoon: leucocyte count 11,200.

July 24, all pain disappeared. Temperature 99.4 degrees. The conjunctiva still red and the fornices considerably swollen. From this time on the temperature remained normal and also the leucocyte count. The swelling of the glands disappeared but the subconjunctival tissue of the fornices remained swollen for some days. Gradually the follicles and conjunctival swelling disappeared and in about two months the lids presented a normal appearance.

The two cases of laboratory infection (that of Fava and the present one) and the absence of a history of trauma in the other cases, seem to show that the sporothrix is able to penetrate the normal conjunctiva. It also appears from the reports of cases, that infection of the eye may be secondary to a generalized sporotrichosis. Probably in most of these cases the infection is ectogenous, but the suspicion that it may be endogenous in character is aroused by the case of La Personne in which after a violent irido-cyclitis and perforation of the eye ball, sporothrix was obtained from the contents of the bulb. That general symptoms may arise from a primary lesion of the eye is indicated in our case by the fever, leucocytosis and pains in the bones of the extremities.

As to the diagnosis, some of the clinical features of this infection are common to other conditions. Lymphadenopathy would be present with chancre of the conjunctiva, but in this condition it is unusual to have such multiple erosion or ulcerations, and scrapings from such an ulcer would probably show the characteristic spirochete.

Tuberculosis of the conjunctiva would probably not be so rapid in its course and it would be a week or more before the caseous tuberculous nodules would break down and form the ulcer, whereas in sporotrichosis the little ulcers develop in a few days.

Parinaud's conjunctivitis presents more points of similarity, and it is possible, as mentioned by Morax, that cases of sporotrichosis may have been mistaken for Parinaud's conjunctivitis.

Mr. C. P. McCullough stated that the diagnosis of the organism bacteriologically is comparatively easy. Scrapings were first taken from the eye and inoculated on various kinds of media, aerobic and anerobic, but non-aerobic cultures showed no organisms. At the end of 72 to 84 hours there were slight colonies which appeared on one per cent dextrose agar media. These appeared as slightly raised, grayish-white colonies, pin point in size, but at the end of four days the colonies formed the characteristic appearance, grayish-white, elevated, and with a peak that runs almost like the peak of a mountain, with corrugated surfaces. The three original culture tubes showed the characteristics of the organism. Examination with the microscope showed best with Gram positive stain. The organism retains Gram positive, and at the end of 48 hours there were mostly filamentous growths in the shape of conidia. At the end of three or four days growth the microscopic appearance is practically that of conidia, very little of the filaments being seen. Bacteriological tests were made of the organism, tested from an immunological standpoint. The agglutination reaction as well as the opsonic index was gradually increasing each day.

Experiments were tried out to see whether or not various strains of the organisms could be identified. In the work with the sporothrix he has been using five different strains, four strains isolated in this country, and one isolated in France, and it was found they could not identify the organism from a bacteriological or cultural standpoint, so that immunological tests were tried, and there was no difference between the types of the organisms at all.

Dr. Ludwig Hektoen reported the case of a boy who lived in Iowa. The boy hit the index finger with a hammer and there developed various subcutaneous nodules. It was from the pus of these nodules that the sporothrix Schenkii was isolated. Since that time about fifty to sixty cases of this disease have been described in America. The majority of cases have occurred in the Missouri Valley. There seems to be some condition peculiar to that valley which favors the development of this organism which is supposed to grow on grasses or vegetables, although it is not known exactly how infection occurs in nature. There is only one case reported of contact infection.

Dr. Hektoen showed slides illustrating the later phases of the disease. It was the chronic course of the infection that led Schenk, when he described the first case, to describe it as a case of refractory subcutaneous abscesses. Eventually they healed perfectly. The disease can be reproduced very nicely in white rats and white mice. On a slide he showed the body of a white rat inoculated intraperitoneally, and the scattered whitish masses were nodules that developed. These nodules contain pus and in the pus are the spores. It is difficult to demonstrate conclusively the presence of spores in the pus from human cases, but they resemble very much fragments from leucocytes and other nuclear detritus, but in some of the smears from the eyes of the patient whose case was reported by Dr. Wilder he thought the spores could be seen, but he was not absolutely sure about it. The same disease caused by the sporothrix develops in the horse and gives rise to subcutaneous nodules the same as those that occur in the disease in man.

It is interesting to note that 22 of the American cases of sporotrichosis have been described as having occurred in North Dakota. Some of these cases were described originally as tuberculous ulcers of the skin.

The Relation of Increased Intraocular Tension to Acute or Chronic Accessory Sinus Disease.

Dr. Henry Manning Fish stated that increased intraocular tension and various ocular symptoms suggesting glaucoma appearing in connection with disease of the nasal accessory sinuses have been reported by Quaglino, Lennox Browne, Cozzolino, Berger, Ayers, Ziem and others. The author in 1907 reported two cases of primary glaucoma and one of secondary glaucoma in which marked amelioration of the symptoms resulted after drainage of the sinuses with improved vision and increase in the size of the visual field.

Several cases with glaucomatous symptoms, some of which showed marked improvement following treatment of the sinuses, are included in the author's paper.

Dr. Oliver Tydings has had such cases as were reported by Dr. Fish. He had such a case in his office last week of increased intraocular tension on account of a sinus condition.

Osteoma of the Orbital Cavity.

Dr. Oliver Tydings reported a case in which he removed a vascular bony tumor from the orbital cavity.

Oxalic Acid Burn of the Eyeball.

Dr. George F. Suker reported the case of a woman who had divergent concomitant strabismus, and on whom he did advancement and shortening in one eye. Vision in each eye was 20/20. He went through the usual procedures in this case. The cornea began to be hazy, and he thought the excessive use of cocain may have caused the condition of the cornea. He suggested to the intern that he thoroughly flush out the eye with boric acid and wait a moment or two, close the lid and open it. On reopening the lid he dropped in more of the solution, and in the meantime the cornea became quite white, and all the patient could do was to count fingers at one foot. He subsequently found out that a mistake had been made in solutions. The line of treatment was the instillation of warm olive oil, a warm, compress, and irrigations every ten or fifteen minutes. She left the operating room able to count fingers at one foot and the cornea practically opaque, with very little swelling, but intense pain. From this time the cornea cleared up and in the space of about two weeks vision was 20/20. The burn corresponded with one produced by carbolic acid. A mistake had been made in handing him the oxalic acid solution. In the same connection he spoke of a sulphuric acid burn as the result of a golf ball explosion.

Dr. Wilder asked what make of golf ball contained sulphuric acid.

Dr. Suker replied water cores.

Dr. Wilder said these were not made any more or were not used. The old colonel did not contain sulphuric acid. He did not see how any golf ball could contain sufficient acid of caustic strength and be serviceable as a golf ball.

Dr. Frank Carroll said he had confirmation of the fact that golf balls contain sulphuric acid. A little patient of his, a boy, was whittling a golf ball down to get the rubber bouncer inside until he reached the center, and then some juice spurted in his eye. The eye was saved, but examination of the contents of the ball showed that it contained a weak solution of sulphuric acid.

Dr. Willis O. Nance saw the case Dr. Suker had reported about twelve or fifteen months ago. It was the first he had heard or seen. The last analysis he had seen reported in ophthalmic literature was that the contents of these balls were a combination of chlorid of lime and soap. He did not know they contained sulphuric acid. He could hardly see how a solution of sulphuric acid strong enough to do any damage could be contained in the rubber container. He had seen two or three cases since that time.

Dr. H. B. Young, Burlington, Iowa, mentioned a mistake which occurred in one of the hospitals in Burlington, where a nurse was supposed to have given a solution of boric acid to wash out the eye of a new born baby, but investigation showed she used oxalic acid. Boric acid solution for flushing out the eyes of a new born baby was absolutely useless in his experience.

Dr. Nance saw a case of oxalic acid burn of the eye two years ago which occurred in a trained nurse in one of the hospitals of Chicago. The eye of the nurse was irrigated with a solution of boric acid supposedly by another nurse, and immediately following the instillation or irrigation of the eye considerable pain resulted and the nature of the fluid used was discovered. The eye was immediately irrigated with a true solution of boric acid. Other than a conjunctivitis, which persisted for four or five days, no ill result followed the accident.

Dr. A. L. Adams, of Jacksonville, reported another case of golf ball accident in a child that was standing by watching two boys open a golf ball, and the fluid spurted into the child's eye. The child was brought to the hospital. He found a whitish eschar extending to the corner of the inner canthus, but not involving the cornea. On the theory that it was caustic alkali, he washed out the eye with boric acid solution and used it as a liniment, and the eye healed under that treatment in a few days.

Dr. Willis O. Nance said it was very essential to find out the nature of the fluid in core balls by chemical analysis. The society should have an examination made of the contents of this fluid in cord golf balls with the intention of knowing positively what the contents are. If it is an acid, treatment would be entirely different than if the fluid was an alkali. These cases were getting to be not very infrequent.

Dr. E. J. Gardiner said the golf association has issued a warning about these balls, and he thought their use would be discontinued.

Dr. William H. Wilder said the manufacturers of the colonel ball, which was a cored ball, had discontinued making it since so many accidents had been reported. One type of ball had been found to contain a paste made of chlorid of zinc and soap. When such injuries were likely to follow the public should be warned. It would be a good move for the society to take some action upon the matter and send out as a society a note of warning, calling the attention of the public to the injurious effects of such things, and he believed the proper medium would be an announcement through the council on health and public instruction of the American Medical Association.

Gonorrheal Conjunctivitis.

Dr. Douglas A. Payne reported an interesting case of gonorrheal conjunctivitis which demonstrated (1) the great danger to which the public exposed themselves in allowing untrained persons to remove or attempt to remove foreign bodies from the eye. (2) The possible danger of infection of the eye in barber shops and by barbers' utensils. (3) The necessity for hospital care of these cases. (4) The necessity for intelligent and conscientious handling of cases of this nature by careful and competent nurses. (5) The necessity for the education of the public of the dangers that lurk in unknown and hidden places.

Dr. E. S. Antisdale exhibited an instrument to facilitate the more thorough treatment of gonorrheal ophthalmia and also protect the cornea.

Unusual Retinal Lesion.

Dr. W. A. Hager, South Bend, presented a young man, 23 years of age, who had the usual diseases of childhood. At 15 he began to have an unusual condition of the retina, which was present in one eye. Two years later the other eye became affected. He wanted information from the members as to their diagnosis.

Dr. C. C. Darling thought the case was one of reattachment of the detached retina. The defects in the field corresponded to the part of the retina which appeared to be detached. The defects in the field corresponded exactly to the white line that runs across the retina. Below the field is cut off. In the other eye the field is cut off in the same manner.

Dr. W. H. Woodruff, of Joliet, said the condition was quite different in the two eyes. The white lines were quite evident. In the right eye he was not certain it represented detachment of the retina. In the left eye the lines followed the blood vessels indicating there had been disease of the vessel walls. If it was a detachment of the retina there was evidently the primary condition of chorio-retinitis, or an atrophic condition following a chorio-retinitis.

Dr. W. F. Coleman said there was undoubtedly detachment of the retina, and some of the opaque fibers might be reattached. He had a case at present which had bothered him as to whether it was a simple, ordinary type of detached retina. He had not seen such multiple detachments as in this particular case, and with an opaque lens similar to this. He thought it might be a case of angioneurotic edema. He had never seen such a case, and could not find the description of such a case. If any member had seen such a case he would like to hear remarks upon it.

Dr. Harry S. Gradle differed from Dr. Darling and said from the history there was a gradual onset in both eyes extending over weeks and months, without any sudden loss of vision or sudden loss of the field of vision in any way, and there was no time in which there was improvement in vision. Detachment of the retina would mean a difference in the height of the retina at different points, and this was scarcely noticeable. There might be an atrophic condition of the choroid in one eye, particularly the temporo-macular ridge which would scarcely come under the head of detached retina.

Dr. Willis O. Nance expressed the opinion, after examining the left eye, of retinal edema being present. The cause of that edema he did not know.

The Art-Side of Lenses.

Dr. J. Whitefield Smith, Bloomington, said the expression of the eye depends in such a large measure on the size and shape of the palpebral fissure, that whatever shaped lenses are to be used they should not mar this most essential feature. Since the shape of the palpebral fissure is of so much importance in the expression of the eye, and the expression of the eye is so essential to the other features of the face, it is evident that the whole countenance is influenced by it. Furthermore, since the lines that describe its shape and dimensions conform very closely with the shape of the superior border of the orbit, the arch of the brow, the deep fold of the upper lid beneath the brow, the folds on the surface of the upper lids, the curved direction of the lashes when the lids are open and the folds on the surface of the lower lid, it would seem that lenses corresponding to their outlines would complement these natural lines and lineaments about the eyes and add to the expression of the features of the face rather than detract from them by cutting these lines as is done by the use of broad oval lenses.

The line or the circumference of the lens is of much importance, for it defines or expresses the forms of the lens.

Dr. Clark Hawley said that oculists neglected the art side in prescribing glasses for patients. For many years no glasses had been put on any of his patients without an order being written for every measurement he might think of to make the glasses of the proper shape so as to harmonize and conform to the features of the face.

Orthotic Albuminuria.

Dr. Frank Carroll, of Cedar Rapids, Iowa, stated that this condition is not at all infrequent, that it occurs in children otherwise apparently normal; that in many cases it occurs only as a concomitant symptom of a constitutional lack of development, the evidence of which may be found universally distributed throughout the body. In many cases no constitutional symptoms are found and this peculiar albuminuria manifests itself in the eyes alone. This albuminuria is not constant, but may disappear from time to time and recur at frequent intervals. Most of these cases are found in children with a neurasthenic tendency and sometimes may be grave indeed, although in the majority of cases rest is all that is required to make the child well. Sometimes the albumin will persist in the urine when all of the other symptoms have disappeared.

In children of a decided neurasthenic tendency the treatment must be a general one and not directed to the eye wherein the diagnosis was made, nor must it be a dietetic or postural one aimed at the albuminuria per se, but must be one to restore the entire nutritional condition of the child to a normal level, when it will be found that the albumin will spontaneously disappear.

In this case he examined the fundus and discovered a condition of the retina which caused him to send her to her family physician for an examination of the urine as he suspected a slight nephritis, and yet really had no strong grounds for the diagnosis. The physician made careful examination and the diagnosis of orthotic albuminuria was established. The patient has been held under careful observation and she is now apparently well, and her treatment has consisted principally in the non-use of the eye and careful care of the body.

Dr. George F. Suker mentioned a case that came under his observation a number of years ago of a young man, 25 years of age, who had had orthotic albuminuria for fifteen years, and prior to that time did not know anything about it. When he underwent arduous work in the evening, about five or six o'clock, his retina would lead him to believe that he had optic neuritis or neuroretinitis, and the following morning, after a good night's rest, the retina would clear up entirely. On Sundays he had no trouble with his eye. Albumin could be obtained from the urine the latter part of the day, but never early in the morning. The albuminuria was not pathologic, because these patients did not go on to nephritis, but cleared up in the course of time. If they persisted beyond the age of puberty, they persisted everlastingly. As a rule, they stopped in the acute stage. None had gone on to the typical picture of albuminuric retinitis. They had asthenopic symptoms, with retinal exhaustion, and gave the picture of retinal hyperemia which one might think was a neuroretinitis.

Dr. Frank Carroll, in closing, had seen half a dozen cases other than the one he reported as under observation now, and what Dr. Suker had said was true.

An Anatomic Study of a Case of Temporal Conus (Coloboma) in an Hyperopic Eye.

Dr. E. V. L. Brown, stated that the essentials of the entire finding consist of a crescentic defect in the pigment epithelium and all the layers of the chorioidea along the temporal border of the disc in an eye of the hypermetropic type (23 mm. axial length). The chorioidea stops a considerable distance temporal to the disc. Almost the entire defect is bridged over and filled out by a fold or duplication of the retina. This is a direct continuation of the two nuclear layers of the retina. The nerve fibers go over into the nerve head in a normal way. The anterior layers of the sclera are absent over the floor of the conus but *the sclera is nowhere ectatic,* either behind the conus or elsewhere.

In myopic conus the length of the eyeball is increased and the chorioidea torn away from the margin of the disc. The condition is therefore developmental and not congenital, as must be assumed in our case from the short axis. In the non-myopic eye the conus, or coloboma, is due to an overgrowth of the secondary optic vesicle at its junction with the optic nerve at a time when the mesoderm of the sclera and chorioidea has not yet been laid down. The retinal fold then effectively blocked the development of the chorioidea and sclera at the nerve and the conus results.

In the only other case reported, that by Elschnig, the temporal conus (coloboma) was deeper and involved the optic nerve sheaths.

WESLEY HAMILTON PECK, M. D., *Secretary.*

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

The ordinary meeting of the Section was held on Wednesday, December 3rd, under the presidency of Sir Anderson Critchett, Bart., C. V. O.

Mr. Cole Marshall showed a case of staphyloma posticum verum, Mr. Leslie Paton two cases of rodent ulcer treated with CO_2; Mr. Macnab a case of infiltration in and around the iris, and Mr. Grimsdale a case of microphthalmos. Mr. Herbert Parsons showed specimens of experimental glasses prepared by Sir William Crookes, O. M., P. R. S. They were synthetically prepared glasses. Sir William Crookes had two soda fluxes made by Messrs. Powell, and added to these specimens of flux certain metals in definite proportions. He then made the glasses in small quantity, cut slices, polished them, and investigated their properties in reference to transmission of heat, and he had taken photographs of the absorption of ultra-violet rays with a quartz spectrograph to test their transmission of luminous rays, and estimated their colour with the tintometer. In order to test with greatest possible delicacy, Sir William invented an exceedingly delicate instrument named the radiometer balance. He made a glass which cut off 96% of the heat. The subject was of much wider importance and applicability than the research seemed at first to show.

Dr. Morrison Legge, of the Home Office, spoke at considerable length on the subject. He said glass-worker's cataract was brought to his notice as a member of the Departmental Committee which sat to enquire into the question of compensation for industrial diseases, in 1906; and much valuable information was forthcoming from a very intelligent Secretary of a glass-workers' association. The late Mr. Simeon Snell set himself to collect information on the subject, but his method was not calculated to yield the truest results, for he circularised the manufacturers themselves, asking how many cases of cataract they had known among their workers. As a result Mr. Snell came to the conclusion that cataract was not specially prevalent among glass-workers. A systematic examination of workers for the condition might result in men having the condition being discharged, whereas it took ten to twelve years to prove disabling. He, Dr. Legge, went himself into the glass factories of St. Helens and Sunderland, and he was very much impressed by the number of men who came up showing this cortical cataract, varying in size from a pin's head to what looked like a large blot of ink in the center of the pupil: it was quite different from the peripheral striae in senile cataract. He was struck by the small degree to which the eyesight of the patients suffered. In only very few cases were there opacities in the cornea.

The President, in thanking Dr. Legge for attending and making his valuable contribution, said that in Italian glass works the workers were much nearer the flame, and it was very rare indeed to find a worker of forty years of age whose cornea was not affected.

Mr. N. Bishop Harman read a contribution, and showed photographs, on an operation to improve the effect of an artificial eye. His object was to render the loss of an eye less conspicuous. He remarked that, other things being equal, the effectiveness of the disguise was controlled by the shape of the palpebral fissure. With a small fissure, the shell was effective; with a wide and generous form of fissure the shell provided insufficient support, so that the lids dropped away, deep sulci marked the lids, and the shell was exposed in its naked bareness. The operation aimed at doing for the large-eyed what the small-eyed had by nature. The lids were secured in a clamp devised for the purpose, then split at the intermarginal space, and the raw surfaces brought together so as to shorten the fissure. The lid surfaces were protected from scarring by the suture, by rubber guards that also afforded elastic pressure. On the fourth day the suture was removed, and any adjustment of an excessive effect could be made. The effect of the narrowing of the fissure was to draw forward the lids, slightly cover the shell, and shadow it, so that in place of the fixed stare there was a slight and subtle wink. The pull of the lids against each other tended to smooth out the deep sulci above and below; the relative movement of the shell was also improved. The effect was to make the beholder of the face concentrate on the natural eye, which became the fixative feature of the face. In the words of an early poet, it became a face "with one auspicious and one drooping eye": the slightly winking, drooping eye was a companion inconspicuous by reason of its lesser character.

Mr. W. M. Beaumont read a paper on iritis, rheumatic and toxaemic. He said doubts had been thrown upon the existence of a rheumatic form of iritis, and modern views of the nature of rheumatism seemed to coincide with those doubts. The author, earlier, had been a skeptic, and his views had found expression on several occasions in the columns of the British Medical Journal. Poynton's and Paine's invaluable researches, based on bacterial experiment, had stimulated interest, whilst the papers read at the annual meeting of the British Medical Association and at the International Medical Congress brought the subject again to the front. A difficulty arose in Poynton and Paine's results because iritis associated with acute rheumatism was so extremely rare that it might be considered negligible; whereas these investigators had been able, on at least two occasions, to produce iritis by the intravenous injection of the products of rheumatic infection into rabbits. A negation of rheumatic iritis seemed to be a natural corollary of the "passing" of rheumatism, and it seemed to the author that their experiments almost proved too much. He thought that a more extended view of the frequency of toxaemia, and especially of gonorrhoea, as a cause of iritis, would be the outcome of further research.

C. Devereaux Marshall, F. R. C. S.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. A. L. Derdiger of Chicago died on November 12, 1913, aged 47.

Dr. Carroll B. Welton of Peoria has returned from his vacation in Europe.

Dr. Walter J. Pennell of Auburn, Vt., died of cerebral hemorrhage on October 29, 1913, aged 50.

Dr. C. D. Conkey has been elected president of the Interurban Academy of Medicine of Duluth and Superior.

Dr. Robert L. Edwards, a specialist in eye, ear, nose and throat diseases, died at his home in Richmond, Va., on November 12, 1913.

We are glad to report that Dr. William Campbell Posey of Philadelphia is recovering from a recent serious illness with pneumonia.

Dr. Thomas Wistar, at one time a member of the staff of the Wills Eye Hospital, Philadelphia, died on September 27, 1913, at the age of 77.

Another case of inverted vision has been reported in the London papers. A boy aged 5 reads with his book upside down and writes from right to left.

The Southern Medical Society has created an Eye, Ear, Nose and Throat Section, of which Dr. Homer Dupuy of New Orleans is chairman and Dr. S. Nelson of Memphis is secretary.

In the new Medical College of Virginia, representing the consolidation of two schools in Richmond, Dr. Joseph A.

White is professor and Dr. R. H. Wright associate professor of ophthalmology.

Dr. Arthur F. Jackle, late house surgeon in the Massachusetts Eye and Ear Infirmary, has located in Chicago, where he is associated in practice with Dr. Cassius D. Wescott.

A memorial to the late Sir Henry Swanzy is planned, for which contributions are asked. This memorial will take the form of a clinic to be furnished and maintained in the Royal Eye and Ear Hospital in Dublin.

The Southwestern Michigan Eye, Ear, Nose and Throat Society was organized at Kalamazoo, November 4, 1913, with temporary chairman, Dr. Edward J. Bernstein, Kalamazoo; temporary secretary, Dr. Wilfrid H. Haughey, Battle Creek.

The Eye, Ear, Nose and Throat Section of the Jackson County (Missouri) Medical Society is an active organization, with Dr. Hal Foster chairman and Dr. R. J. Curdy secretary. An interesting program is issued in advance covering the entire year.

An interesting example of occupation for the blind is offered by the class in piano tuning in New York City founded by the violinist, David Mannes, who has devoted himself to relieving suffering and encouraging success among the poor who have musical ambition.

The Charity Hospital of New Orleans announces the following officers: Ear, Nose and Throat Division, three chiefs, Drs. Charles J. Landfried, Otto Joachim and Homer J. Dupuy; Eye Division, two chiefs, Drs. Marcus Feingold and Theodore J. Dimitry.

At the annual meeting of the Minnesota Academy of Ophthalmology and Oto-Laryngology, held October 20, 1913, the following officers were elected: President, Dr. J. F. Fulton, St. Paul; first vice president, Dr. J. D. Simpson, Minneapolis; second vice president, Dr. J. M. Robinson, Duluth; secretary-treasurer, Dr. L. A. Nelson, St. Paul.

The International Congress of Medicine held at the University of London gave the gold medal, the only award in this class, for Digestive Ferments, to Armour and Company, Chicago. This is another high acknowledgement of the preeminent quality of Armour's pepsin and pancreatin.

With the death of Edward Nettleship, English ophthalmology loses one of its most eminent names. He was author of one of the standard text-books, surgeon to the Royal London (Moorfields) and St. Thomas Hospitals, and one of the founders and a president of the Ophthalmological Society of the United Kingdom.

Following an inspection of the public schools of Bartholomew County, Indiana, by Dr. James A. Nydeggar, U. S., P. H. S., the State Board of Health of Indiana has recommended that a special hospital be established in that county for trachoma cases. Forty-eight cases of trachoma were found by Dr. Nydeggar.

The death of Professor Edwin Klebs is learned with regret in America, where some years of his active life were spent. He lived in Asheville, N. C., and in Chicago, where he held the professorship of pathology in Rush Medical College. His fame is perpetuated in the "Klebs-Loeffler" bacillus, the micro-organism of diphtheria.

EDITORIAL NOTE.

Owing to the serious and continued illness of Dr. Thomas Hall Shastid he has, much to the regret of his colleagues, been obliged to resign his position as editorial secretary of the OPHTHALMIC RECORD. The duties of this responsible post will be assumed by Dr. Frank Brawley who has so successfully edited the News and Notes column. This portion of the editorial work will in future be under the control of Dr. Emory Hill, 122 S. Michigan Avenue, Chicago, to whom all correspondence relating to this department should be addressed. Several collaborators will regularly contribute editorials and reviews in the future (among them Dr. Burton Chance of Philadelphia.)

IN MEMORIAM.

DR. JOHN GREEN.

The death of Dr. John Green, which occurred December 7th, 1913, at his residence, St. Louis, Mo., marked the passing of one of the masterly minds that aided in moulding the high type of ophthalmology that has obtained during the last half of the nineteenth century. In his earlier years, being a pupil of H. W. Williams and a friend of Bowman, Donders, Snellen and De Wecker, and later in intimate society relations with Noyes of New York, Norris, Agnew, Loring and Harlan, he was imbued with all the noble sentiments and high ideals that actuated these great characters in laying the foundations for a strictly special and dignified branch of the medical profession, which should command the respect of the scientific world, as well as that of the medical world.

Being the pioneer standard bearer of these ideals west of the Mississippi, in conjunction with Holmes in Chicago and Williams in Cincinnati, likewise pioneers in the Ohio Valley and in the Lake region, he never at any time during the long period of his active practice, from 1866 to 1913, swerved an iota from these ideals, never recognizing or giving encouragement to charlatanry or incompetency in any form, although surrounded by both on all sides and often resisting their pressure, greatly to his own financial detriment.

Later in life in conjunction with the renowned compeers of his early days, he enjoyed the pleasurable satisfaction of seeing grow up as the result of their instruction, an ophthalmic student body that he could respect, and in which he took infinite pride and interest.

Being a clear, concise writer, he has contributed to medical literature many of its most polished and instructive articles. His inventive genius has provided for ophthalmology in the department of optics a series of the best astigmatism charts extant; several series of geometrical ratios for test letters and characters, which have been adopted in France and in the United States by leading ophthalmological societies; block test letters of excellent symmetry and design, and a valuable series of stereoscopic tests for binocular vision.

To medical ophthalmology he has given a method by which a permanent, clear solution of the alkaloid atropia may be made with castor oil, and also a solution of cocaine and atropia in castor oil, both of which are of great value in the treatment of many forms of iritis and corneal ulceration. For surgical ophthalmology he devised a mode of handling lachrymal stenosis by means of lead styles, which in many forms of this affection is eminently satisfactory, and he originated an operation for cicatricial entropion that is safer and more humane than any that had preceded it.

Locally, in the city of his adoption, he was a powerful factor in the advancement of medical education to its present high state of efficiency. In 1886 he was chosen professor of ophthalmology in the St. Louis Medical College. Later he was most influential in combining this college with Washington University. Following the combination and the changing of the name from the St. Louis Medical College to the Medical Department of Washington University he was retained in his position as professor of ophthalmology, and later as professor emeritus in the University until his death .

In his profession he served rich and poor alike, esteeming none too lowly for the touch of his great professional ability. He was universally known as a man of unflinching and uncompromising moral courage, adhering to what he believed to be right under all circumstances. His vast fund of exact knowledge, his high moral standards and his honesty commanded for him the profound respect of all with whom he came in contact. Always a staunch, reliable friend and advisor he was devotedly esteemed by those who knew him best.

Apparently with very little suffering and with a duration of only a week, his long, useful, eminently successful career was closed by an attack of pneumonia in his seventy-ninth year. J. W. CHARLES.

Wanted—Position in an oculist's or physician's office by a capable young woman who has had ten years of experience in an oculist's office. Best of references. Address c/o The Record.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo(P.-G.) J. F. Burkholder (E. E. N. T.) G. W. Mahoney (Poli.)	*Geo. F. Suker (P.-G.) Oliver Tydings (E. E. N. T.) C. H. Francis (Poli.)	E. J. Brown (E. E. N. T.) S. M. Hager (Poli.)	G. W. Mahoney (Poli.) Rich'd S Pattillo (P.-G.) J. F. Burkholder (E. E. N. T.)	Richard S. Pattillo (P.-G.) Oliver Tydings (E. E. N. T.) C. H. Francis (Poli.)	E. J. Brown (E. E. N. T.) *S. M. Hager (Poli.)
10 A.M.	L. J. Hughes (E. E. N. T.)	J. R. Hoffmann (E. E. N. T.)	E. J. Brown (E. E. N. T.)	L. J. Hughes (E. E. N. T.)	J. R. Hoffman (E. E. N. T.)	J. R. Hoffmann (E. E. N. T.)
	Brown Pusey, N.W.U Every day, 10-12 A.M.	....	....	....	....	....
11 A.M.	H. W. Woodruff (E. E. N. T.)	A. G. Wippern (E.E.N.T.)	J. R. Hoffman (E. E. N. T.)	A. G. Wippern (E.E.N.T.)	H. W. Woodruff (E. E. N. T.)	A. G. Wippern (E.E.N.T.)
1 P.M.	....	Willis O. Nance (C.C.S.)	....	Willis O. Nance (C.C.S.)	....	Willis O. Nance (C.C.S.)
2 P.M.	E. V. L. Brown (Inf.) E. J. Gardner (E.E.N.T.) M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) D. A. Payne (Ills. Med.) N. E. Remmen (Inf.) Emily Selby (Inf.) Wm. H. Wilder (Rush) *H. W. Woodruff (Inf.) N. A. Young (Inf.) Francis Lane (Rush) J. B. Loring (P. & S.) E. K. Findlay (P. & S.) *Oscar Dodd (Inf.) M. H. Worthington (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) Thos. Faith (E.E.N.T.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) F. A. Phillips (Inf.) *Wm. H. Wilder (Inf.) H. B. Williams (Inf.) M. H. Lebensohn (P.&S.) S. L. McCreight (C.C.S.)	E. V. L. Brown (Inf.) W. A. Fisher (E E.N.T.) M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) N. A. Young (Inf.) J. B. Loring (P. & S.) E. K. Findley (P. & S.) *Oscar Dodd (Inf.) M. H. Worthington (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) Thos. Faith (E.E.N.T.) E. K. Findley (Inf.) Wm. E. Gamble (Inf.) E. J. Gardner (E.E.N.T.) *Paul Guilford(St.Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring (Inf.) D. A. Payne (Ills. Med.) F. A. Phillips (Inf.) *Wm. H. Wilder (Inf.) H. B. Williams (Inf.) Francis Lane (Rush) M. H. Lebensohn (P.&S.) S. L. McCreight (C.C.S.)	E. V. L. Brown (Inf.) M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) Wm. H. Wilder (Rush) H. W. Woodruff (Inf.) N. A. Young (Inf.) J. B. Loring (P. & S.) E. K. Findlay (P. & S.) *Oscar Dodd (Inf.) Thos. Faith (E. E. N. T.) M. H. Worthington (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) W. A. Fisher (E.E.N.T.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) D. A. Payne (Ills. Med.) F. A. Phillips (Inf.) *Wm. H. Wilder (Inf.) M. H. Lebensohn (P.&S.) S. L. McCreight (C.C.S.)
3 P.M.	W. Allen Barr (C.C.S.) *Wm. E. Gamble (P.&S.)	H. H. Brown (Ills. Med.)	*J. E. Harper (P. & S.) W. Allen Barr (C.C.S.) *Wm. E. Gamble (P. & S.)		W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.)
4 P.M.	W. F. Coleman (P.-G.)	C. W. Hawley (P.-G.)	G. F. Suker (P.-G.)	C. W. Hawley (P.-G.)	W. F. Coleman (P.-G.) Brown Pusey (County)	

*Special operative eye clinics.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 810 W. Harrison Street.

E. E. N. T.: Chicago Eye, Ear, Nose and Throat College, Washington and Franklin Streets Clinics all day.

County: Cook County Hospital, W. Harrison and Honore Streets.

Ills. Med.: Illinois Medical College, 182 Washington Blvd.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 174 E. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

Vol. XXIII CHICAGO, FEBRUARY, 1914 No. 2, New Series

ORIGINAL ARTICLES

THE PRISM-DIOPTRY ESTABLISHES A DIMENSIONAL UNIT AT THE OPTIC CHIASM.*

BY CHARLES F. PRENTICE, M. E.

NEW YORK CITY.

President, New York State Board of Examiners in Optometry; Special Lecturer on Theoretic Optometry, Columbia University, New York. Author of A Treatise on Ophthalmic Lenses (1886); Dioptric Formulae for Combined Cylindrical Lenses (1888); A Metric System of Numbering and Measuring Prisms (the Prism-dioptry) (1890); The Iris as Diaphragm and Photostat (1895), and other optical papers.

Illustrated.

The paper of Mr. Prentice, while it predicates that knowledge of the principles of physiological optics which every educated ophthalmologist possesses, should stimulate a further study of these principles. The hypothesis of a chiasmal image, as presented by the essayist, is new and, if accepted, will be a real addition to the subject; but some of us will find it difficult to accept it, not only because it is difficult to conceive of an image anywhere obtained except at the primary sensitive-plate of the retina, where it is (physically) formed, or within the central area about the calcarine fissure where it is (psychically) interpreted. On the other hand, these difficulties are by no means unsurmountable. As Mr. Prentice, by inference at least, points out, we know that there are other neuronic points and areas within the cranium that greatly influence the character of the visual image, and as there is no valid reason why one should not conceive of image-formation at any point along the optic radiational lines the concept of a conjoint image within the chiasma is not only a thinkable but may be a useful idea. However, starting out with the premise of such an image, the writer's discussion of its relations to the prism-dioptry and the conclusions he draws are well worth the consideration of the OPHTHALMIC RECORD'S readers. In any event, this journal will be glad to publish criticisms of this important and unsual paper. CASEY WOOD.

It is here proposed to make a disclosure respecting the acuteness of visual discrimination at the optic chiasm, and to reveal still another application of the prism-dioptry in physiologic optics. In the interest of lucid illustration license is taken to portray somewhat differently certain fundamental optic principles when they are rigidly applied to the visual sense of two associated eyes.

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Furthermore, reference will be made to the so-called *chiasmal image*, by which, however, it is not intended to convey the idea that an image in its strictest sense is located at the optic commissure; but, it shall signify that orderly assemblage of the optic-nerve fibrils within the cross-sectional and comparatively small area of the optic chiasm which receive their individual stimuli from corresponding points in each retinal image. Of course, this also implies that the supposed chiasmal image should be proportionately smaller than the retinal images in order that they may appear in their entirity within the more circumscribed area of the chiasm. However, as this must ever remain a matter of pure conjecture, the relative proportions of the retinal areas and the area of the chiasm may be ignored. Therefore, the *figurative* chiasmal image may be safely accepted, if for no other reason than that it at least makes it easy to produce diagrams in which the retinal images and the image conceived by the brain are separately pictured to illustrate the phenomenon of binocular vision. With this conception of the chiasmal image, orthoscopic binocular vision may be said to require absolute equality in the dimensions of the retinal images, in order that these identical images, when conveyed by the optic nerves, may exactly cover each other at the optic chiasm. In other words, the axial image-points m and m_1, Fig. 1., being separately transmitted by their respective optic-nerve fibrils, must exactly cover each other at the center C of the chiasmal image, which is, therefore, of two-fold light and shade intensity, provided that the light and color perceptions, respectively, are the same for each eye. In Fig. 1 this increased intensity of the chiasmal image at C is graphically illustrated, being achieved in the drawing through superposition of the vertical and horizontal shadings used respectively to distinguish the right and left retinal images in R and L from each other.

This single chiasmal image at C corresponds to that equipoise of the extrinsic ocular muscles which is associated with the normal directions of both visual axes, called orthophoria. In fact, it is that condition in which the centers m, m_1 and C of their respective images are all located in the same horizontal plane hH, thereby insuring a common horizon for them as shown in Fig. 2. Therefore, the *chiasmal horizon*, in the absence of a better term, may be said to be the horizontal diameter of the chiasmal field in whose center C are located the superposed chiasmal images transmitted from the macular centers m and m_1, the foveae of both eyes. In fact, as will be later shown, the axial image-points m and m_1, the centers of the maculae, are always projected to the center of the chiasmal field, C, regardless of the directions of the visual axes. It is evident that a faulty projection of the visual axes, such as in hyperphoria, for instance, will cause a change in the elevation of at least one of the axial image-points, m, m_1, with respect to a common horizon H, thus creating two vertically displaced images of the same object somewhere within the field of the optic chiasm.

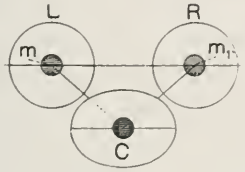


Fig. 1.

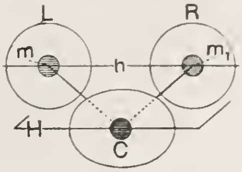


Fig. 2.

In order to become familiar with the location of such dual chiasmal images it is necessary first to determine the positions of their corresponding retinal images. A fundamental law in physiologic optics teaches that the center of the object and the center of the image are in line with the nodal-points of the eye; in other words, the center of the object, the nodal points and the macular center are points upon the same line, the visual axis, located in a plane coincident with, or that may be inclined to, the horizon. In the following diagrams the single nodal point of Donders' reduced eye is applied.

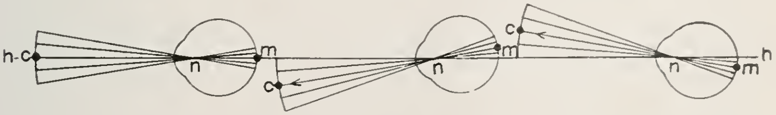


Fig. 3. Fig. 4. Fig. 5.

In Fig. 3, the visual axis cm is coincident with the horizontal plane hh. In Fig. 4, the visual axis cm is directed below, whereas, in Fig. 5 it is directed above the horizontal plane hh.

In each of these figures the visual axis is directed to the center *c* of its own object-space, irrespective of the dimensions of the object that may be located upon the horizon, so that the visual axis may also be said to be a line connecting the center *c* of the object-space with the center *m* of the image-space. Therefore, each change in the direction of the visual axis merely establishes a new center *c* in the object-space of the deviating eye which is in line with the fovea *m*, the center of the image-space.

In short, for the deviating eye, Fig. 7, *D* is the displacement of the visual axis cm_1 from the object-center *O*, whereas *d* is the corresponding displacement of the fovea m_1 from the image-center I_1.

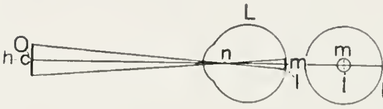


Fig. 6.

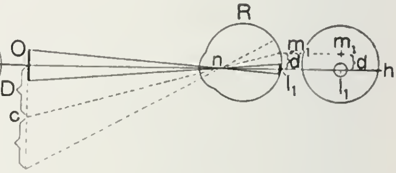


Fig. 7.

It is here proposed to confine the discussion to hyperphoria, because it may be more effectually counteracted through the use of prisms than any other muscular imbalance. For convenience, the left eye, Fig. 6, is pictured from the temporal side with its visual axis *cm* horizontal; therefore, the centers of the object *O* and its retinal image *I* are located in the plane of the horizon. The right eye is shown in Fig. 7, from the nasal side, with its visual axis cm_1 in the object-space below the horizon; wherefore, the center of the same object *O* is above the visual axis cm_1, and the center of the image I_1 is correspondingly below it at a distance *d* from the fovea m_1. Comparison of the figures shows that the centers of the retinal images *I* and I_1 in both eyes are located in the same horizontal plane *hh*, but that they occupy quite different positions with respect to their associated axial image-points, *m* and m_1. The fovea *m* of the left eye and the center of its retinal image *I* are coincident, whereas, in the right eye its retinal image-center I_1 is below the fovea m_1. Moreover, it is quite evident that there would *not* be any consciousness of a difference in the elevations of the retinal images, *I* and I_1, if they were transmitted by the optic nerves to the chiasm in the same horizontal plane *hH*, as shown in the *incorrect* Fig. 8.

That two images are produced which effect consciousness of a difference in their elevations with respect to a common horizon H is proof that the phenomenon must be explained through the associated functions of the optic nerves and the chiasm. In fact, this consciousness of two images can only be accounted

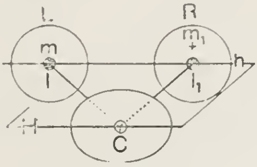


Fig. 8.

for by the assumption that the *axial image-point of each eye at the macula is conveyed by its corresponding optic-nerve fibril to the center of the chiasmal field.* In other words, *both macular centers* m *and* m_1 *are transmitted by their respective nerve fibrils so as to produce superposed images of themselves at the center* C *of the chiasm*, Fig. 9., regardless of any deviation that may exist between the visual axes.

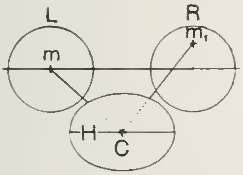


Fig. 9.

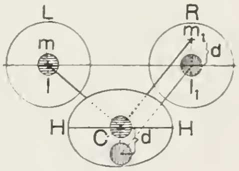


Fig. 10.

Such being the case, the center m of the retinal image I, when transmitted through the *left* optic nerve by its macular fibril mC, Fig. 10, is located in the center C of the chiasm upon the chiasmal horizon HH; whereas, the center I_1 of the retinal image in the right eye is conveyed along the right optic nerve below the macular fibril of m_1 to a point at the

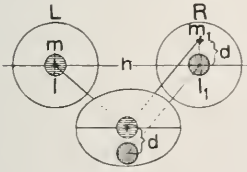


Fig. 11.

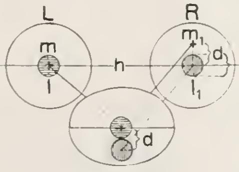


Fig. 12.

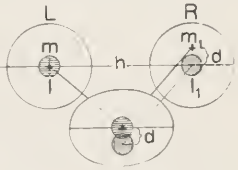


Fig. 13.

same distance d below the chiasmal center C. In short, the vertical separation of the chiasmal image-centers is equal to the distance d between the macular center m_1 and the center I_1 of the image in the deviating eye.

It is further evident that, if the vertical displacement d of the fovea m_1 in the deviating eye is greater than or equal to the diameter of the retinal image itself, two separated chiasmal images are formed, Fig. 11 and Fig. 12; whereas, if the displacement of the fovea m_1 in the deviating eye is *less* than the diameter of its retinal image, two eccentrically superposed chiasmal images are produced, Fig. 13. Therefore, the nature of these dual images, as to whether they are separated or overlap, depends upon the proportion of the displacement d of the fovea m_1 in the deviating eye to the diameter of its retinal image I_1 centered in the horizontal plane h.

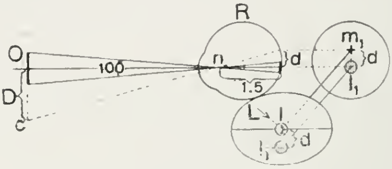


Fig. 14.

Moreover, the foveal displacement d and the diameter of the retinal image may both be determined, provided the distance of the nodal point from the retina is known. For example, Donders' reduced eye being chosen, and in which the distance between the nodal point and the retina is equal to 15 mm., or 1.5 cm., it is apparent from Fig. 14 that:

$$\frac{d}{1.5} = \frac{D}{100} \therefore d = \frac{1.5D}{100},$$ in which D is a dimension in the tangent plane Oc at a distance of 100 cm. from the nodal point n. Therefore, D is synonymous with the prism-dioptry when it is made equal to 1 cm., and, if introduced in the above equation, gives $d = \frac{1.5}{100} = 0.015$ cm., or 0.15 mm. as the separation of the chiasmal image-centers for a deviation of the visual axes corresponding to 1 prism-dioptry. The above equation also proves that:

In manifest hyperphoria of 1 prism-dioptry the distance between the chiasmal image-centers is equal to one hundredth part of the distance between the nodal point and the retina in the deviating eye. It is also apparent that the separation of the chiasmal image-centers will increase in proportion to the deviation between the visual axes, wherefore, 1^Δ 2^Δ 3^Δ 4^Δ of deviation between the visual axes correspondingly produce 0.15 0.3 0.45 0.6 mm. separation of the chiasmal image-centers.

It is next necessary to determine the size of the retinal images, in order to ascertain if the chiasmal images are separated or overlap for a particular deviation of the visual axes.

As the size of the retinal image depends upon the size of the object, it is convenient to select as the object one of the small letters that represent the conventional unit of visual acuity in Snellen's test types, and whose vertical and horizontal dimensions are embraced by the visual angle of 5 minutes. Therefore, the height of this object corresponds to the tangent of 5′, which, if computed at a distance of 1 meter, is 0.001455 M., or 1.455 mm.: consequently, the object-letter is 8.73 mm. square, at 6 meters, the distance at which the type is used. Incidentally it may be stated that this dimension is rarely exactly reproduced in modern editions of Test Types, and which are often found to be correspondingly faulty in all of the letters. The size of the retinal image, *I*, produced by a letter 8.73 mm. square, when placed at 6 meters from the reduced eye, may be deduced from Fig. 15 as follows:

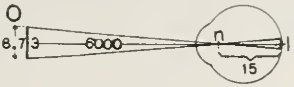


Fig. 15.

$\frac{I}{15} = \frac{8.73}{6000} \therefore I = \frac{15 \times 8.73}{6000} = 0.02182$ mm., which is such a minute dimension that, even if mechanically reproduced for inspection, it could scarcely be differentiated by the eye without the use of a microscope.

As 1^{Δ} is known to produce a separation of the chiasmal image-centers equal to 0.15 mm., and the vertical dimension of the retinal image in the deviating eye of normal visual acuity is 0.02182 mm., it follows that the dual chiasmal images are *separated*, since $d = 0.15$ mm. is greater than I or $I_1 = 0.02182$ mm.

In order that the dual chiasmal images may just touch each other peripherally, the diameter of the image I would have to be equal to $d = 0.15$ mm. This value for I being introduced in the equation $\frac{O}{I} = \frac{6000}{15}$ gives the diameter of the object $O = \frac{0.15 \times 6000}{15} = 60$ mm., which is also the value of the prism-dioptry at 6 meters distance.

VISUAL ANGLE 5 minutes.

Distance		Height
60 M.	E	87.3 mm.
	*	60 mm.
36 M.	T	52.38 mm.
24 M.	D	34.92 mm.
18 M.	P	26.19 mm.
12 M.	F	17.46 mm.
9 M.	O	13.095 mm.
6 M.	L	8.73 mm.
1 M.	H	1.455 mm.
⅓ M.	V	0.485 mm.

Reference to the adjoining chart of letters shows that 60 mm. is the dimension of a letter which should be interpolated between *E* and *T*. In other words, all of the letters between *T* and *L*, when viewed at a distance of 6 meters, produce *separated* chiasmal images for a manifest hyperphoria of 1△: whereas, letters or objects which are larger than 60 mm. in height will produce vertically overlapped chiasmal images whose centers are uniformly 0.15 mm. apart.

Separated chiasmal images also apply to type held at the reading distance whenever the letters are smaller than the prism-dioptral deviation between the visual axes in the object-space. For instance, in the accompanying chart the letter *v* is 0.485 mm. high at 1/3 M., whereas the prism-dioptral deviation at this distance is 1/3 of a centimeter, or 3.33 mm. This deviation, being considerably greater than the vertical dimension of the letter *v* in the object-space, will naturally cause visual confusion, through making a printed line of the same kind of type appear to be projected from the position of the line next following when the consecutive lines of type are 3.33 mm. apart. For this reason hyperphoric subjects of 1△, even with normal retinal perception in each eye, can not read very small type, nor without great difficulty even ordinary type, and frequently complain of a sense of uncertainty in following the lines of a printed page.

The limits between which *overlapped* images are produced is made apparent in the following necessarily exaggerated diagrams, in which the dimensions of the various retinal images have been calculated for white square targets of different sizes placed at 6 meters distance. In Fig. 16 the retinal images are 0.15 mm. square, which, being equal to the foveal displacement corresponding to $1^{\triangle}$, not only shows the chiasmal images to be peripherally in contact, but also that the chiasmal image for the left eye is extended below its horizon by an amount equal to the height of the chiasmal image for the right eye, thus producing a vertically elongated picture of the square target that is twice the height of the normal image conceived in orthoscopic binocular vision.

DEVIATION BETWEEN THE VISUAL AXES = 1 PRISM-DIOPTRY.
Foveal Displacement, Separation of the Chiasmal Image-Centers and the Image-Extension = d = 0.15 mm. for Donders' Reduced Eye.

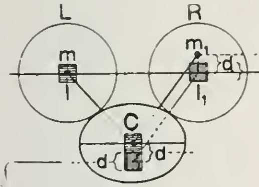
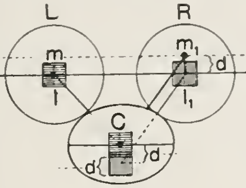
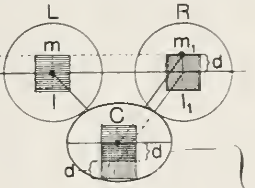


Image Extension.
Object, 60 mm. sq.
Image, 0.15 mm. sq.
Fig. 16.



Object, 87.3 mm. sq.
Image, 0.2185 mm. sq.
Fig. 17.



Fov. Dis.
Separation Chiasmal Image-Centers.
Object, 120 mm. sq.
Image, 0.3 mm. sq.
Fig. 18.

The retinal image in Fig. 17 is 0.2185 mm. square, and being larger than the foveal displacement, shows the chiasmal images to overlap. In fact, as the retinal images proportionately increase in size for larger objects placed at a fixed distance, so will the chiasmal images increase and invade each other vertically from their respective fixed centers. Fig. 18 represents a still larger image, 0.3 mm. square, demonstrating that the chiasmal images overlap each other by one-half. Furthermore, in all of these diagrams it is made apparent that the foveal displacement, the separation of the chiasmal image-centers and the extension of the normal image are one and the same linear dimension. Therefore, it has been conclusively demonstrated that for each prism-dioptry of deviation between the visual axes there is a separation of the dual chiasmal image-centers equal to 0.15 mm.*; that the chiasmal images are *separated* when the retinal images are smaller than the foveal displacement, and that the images overlap when their retinal images are larger than the foveal displacement in the deviating eye. Recalling that the prism-dioptral deviation between the visual axes in the object-space bears the same proportion to the size of the object itself as the foveal displacement to the retinal image in the deviating eye, it is also to be understood that the chiasmal images are vertically separated when the size of the object viewed binocularly is less than the prism-dioptral deviation, and that they overlap when the object viewed is greater than the prism-dioptral deviation between the visual axes. In short, when the diameter of the object at 6 meters' distance is exactly equal to the prism-dioptral deviation between the visual axes, contiguous chiasmal images are formed whose line of contact is the boundary between separated and over-lapped images.

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*Donders' reduced eye, whose first principal focal length F′ is 15 mm.

Familiarity with the principles herein set forth should not only impress the ophthalmic surgeon with the extreme delicacy of the muscular balance necessary to maintain orthoscopic binocular vision, but also encourage him to make effort to counteract minor degrees of hyperphoria through optical rather than by surgical means; especially when it is emphasized that the displacement of the fovea in the deviating eye amounts only to 0.6 of a millimeter for a deviation between the visual axes of 4 prism-dioptries, commonly thought to be effectually corrigible through the application of surgical skill, and which is conceded bespeaks marvelous dexterity where it has been successfully applied in cases of this kind.

A THEORETICAL CONSIDERATION OF SOME PHASES OF SYMPATHETIC OPHTHALMIA.*

BY H. GIFFORD, M. D., OMAHA, NEBRASKA.

The uncertainties concerning the nature and mode of propagation of sympathetic ophthalmia have kept theorizers busy.

The failure to discover the germs required by the theories advanced, almost simultaneously, by Snellen, Leber-Deutschmann and Berlin* has, naturally, with the increase of our knowledge concerning the surprisingly toxic effects of the split-proteid products, led to the development of theories of sympathetic ophthalmia from which microbes, as a direct exciting cause, are largely or completely omitted. So far as I know the first of these theories is that advanced by Brown Pusey.[1] His theory was largely based on the work of Castaigne and Rathery, who found that when the entire pedicle of one of the kidneys of a rabbit was ligated and the degenerating kidney left in place, well marked degenerative changes in the opposite kidney occurred; while if the kidney was removed, no such changes occurred. The application of this result to the eye, led Pusey to suppose "that when a damaged eye degenerates in the orbit, the cells of the eye (probably the lining cells of the ciliary processes and the iris) can give rise to a specific cytotoxin, which, circulating in the blood, picks out the cells of the fellow eye, and may cause changes which we now designate as sympathetic ophthalmia." Pusey's attempt to prove his theory by the injection into dogs, of goat serum from animals immunized with dog's uveal tissue, gave a negative result; but his idea remains noteworthy as the pioneer of the biochemic theories of sympathetic ophthalmia, although German writers on the subject generally are ignorant of it and begin with the work of Golowin[2] who, about a year later, proposed a similar "cyclotoxic" theory, with the additional supposition that the eye, injured by the toxins, thus more easily became the prey of germs circulating in the blood. The most prominent of these bio-chemic theories however, is that which assumes that sympathetic ophthalmia is an anaphylactic phenomenon. It was inevitable that anaphylaxis, the magic key to so many biologic mysteries, should be applied to sympathetic ophthalmia; and the suggestion came almost simultaneously from two pathologists, Bail and Heim, to Elschnig[3] and Kümmell[4] respectively; as these investigators are careful to explain. It was followed by an immense amount of careful work by these men and as the work of Elschnig was first published and was more elaborate, the theory is rightly known by his name. Elschnig's statement of the theory is as follows: "I assume that the cause of sympathetic ophthalmia is not infectious, that is, it has not a bacterial origin but, on the contrary, depends upon some anomaly affecting the whole organism which can easily be detected, as in nephritis, diabetes, or something of the sort; or else is produced by auto-intoxication in the widest sense of the word; or by some anomaly of the constitution" * * * "a trauma severely injures the first

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*It should not be forgotten that the first pathologic evidence of transmission by the optic nerves was given by Alt (Arch. f. Aug. VI, p. 310).

Read at the Clinical Congress of Surgeons, Chicago, Nov. 11, 1913.

eye, at the same time perhaps, infecting it with one of the ordinary infectious germs; or the eye, in virtue of the anomaly of the body, develops from the trauma as such, a non-bacterial inflammation. The disintegration of the tissues which accompanies the inflammation leads to absorption of uveal tissue, and thus to a hypersensitiveness of that part of the uvea not immediately affected by the injury or the primary inflammation of the first eye, as well as of the uvea of the second eye. As the result of this local hypersensitiveness of the uvea, the existing somatic anomaly finds a point of attack, and leads to that inflammation of the uvea of both eyes which is known as the sympathizing inflammation."

Experimentally the theory, as yet, has very little support. In brief, Elschnig has found, after much careful and laborious investigation, that on repeated injections of heteroserum into the rabbit's eye, the latters shows an anaphylactic reaction in the shape of an iridocylitis of limited duration, the reaction being more pronounced when the animal has been previously immunized by injections of the same serum into the blood. Injections of uveal tissue-emulsion, as well as of chemically pure eye-pigment, sensitize the system, as shown by the complement-fixation method, to eye-pigment; not only of the same species but to eye-pigment of other animals. This sensitization can be produced with pigment of the same species of animal, but not of the same individual, nor to so marked a degree as when the pigment of another species is used. The reaction is organ-specific but not species-specific.

Kümmell has obtained similar results; and in rabbits' eyes in which anaphylaxis was produced by repeated injections of heteroserum, has found a lymphocytic nodal infiltration of the uveal tract, quite similar to that observed in sympathetic ophthalmia. With homo-serum or homo-tissue he obtained no anaphylaxis; and in testing the serum of patients with sympathetic ophthalmia he was not able, definitely, to demonstrate a sensitiveness to uveal emulsions. In support of his supposition of an organic anomaly or auto-intoxication, Elschnig has repeatedly tested the urine of his patients for indican and believes that the results thus obtained show an abnormal frequency of auto-intoxication in patients with uveal inflammations.

The convenience of the anaphylactic theory is most attractive, in the easy explanation which it offers of the hitherto fruitless search for a sympathetic ophthalmia germ. But despite the long array of arguments with which Elschnig seeks to supplement the scanty experimental and anatomical basis of his theory, I am unable to see that it offers any other advantage in explaining the known facts of sympathetic ophthalmia, than is offered by the germ theory. The incubation period, the similarity of the anatomical features in the two eyes, the occurrence of sympathetic disease after the various preventive operations, or after a lapse of many years, are explained equally well by some of the forms of the germ theory. For the rare occurrence of sympathetic disease with intraocular sarcoma, which is commonly explained on the theory of endogenous infection, the anaphylactic theory or, equally probably, the cyto-toxic theory may have a slight theoretic advantage. For explaining other facts about sympathetic ophthalmia, the anaphylactic theory has great inherent improbability. Most important of these defects is the explanation which it offers of the almost exclusive occurrence of sympathetic ophthalmia after penetrating wounds, as opposed to its non-occurrence after other forms of eye injury. The assumption of a constitutional anomaly, improbable as it seems, may serve in a pinch, to explain why sympathetic ophthalmia occurs with so small a proportion of penetrating wounds; but it offers no valid explanation of the non-occurrence of the disease, with the numerous non-penetrating injuries and diseases accompanied with extensive disorganization of the uveal pigment.

After this, the anatomical picture of fully developed sympathetic or sympathogenic inflammation is, in the light of our present knowledge, the strongest argument against anything but a microbic origin of the disease; for while we may admit that, in its earlier stages, the sympathogenic inflammation may have no features which distinguish it sharply from the effects produced by non-sympathogenic inflammations, or by anaphylactic experiments, or by the intravenous injections of ferments and bacterial poisons, as shown by Guillery;[5] the fully developed infectious granuloma of sympathetic disease can hardly be a product of anything except microbic action. Anatomically it approaches closely to some of the products of leprosy, syphilis, and above all of tuberculosis. How close its resemblance is to a tuberculoma, is shown by the fact that a specimen shown by Reis[6] to so well known an expert in tuberculosis as Ribbert, was unhesitatingly pronounced by him to be exquisitely tuberculous, and Gilbert reports a similar experience with several good pathologists in Munich.

Among other facts which seem inconsistent with the theory of anaphylaxis, we may mention the well known difficulty of producing auto-anaphylaxis; the horror-autotoxicus of Ehrlich. It is true that in a few instances, experimental auto-anaphylaxis has been produced with some of the abdominal organs; but when we consider that hitherto all attempts at producing anaphylactic reactions in the eye with uveal products of the same species of animal have failed, the improbability of an uveal auto-anaphylaxis seems enormous.* Furthermore, the clinical course of sympathetic ophthalmia is distinctly at variance with what we know of ordinary anaphylactic manifestations; the latter being explosive in character and attaining a maximum violence within a short time after their first appearance. This would lead us to expect, in the eye, something entirely different from the insidious onset which generally characterizes sympathetic ophthalmia. And while some anaphylactic inflammations, after quickly reaching their maximum, drag along for some time without a repetition of the second dose of antigen, thus affording some analogy to the drawn out course of sympathetic ophthalmia; it is hard to conceive how an eye, in which all the uveal tissue must be senitized at practically the same time, could develop anaphylaxis in the form of the separate or isolated areas which we often find affected in sympathetic ophthalmia. Another point in the anatomical distribution of the disease which it is hard to explain by Elschnig's theory is the frequent exemption of the retinal pigment-epithelium, except in the severest cases. Elschnig insists, throughout, that the uveal pigment, including in this the retinal pigment, is the point of attack in the anaphylactic process. This would lead us to expect a speedy dissolution of the retinal pigment-area, with corresponding destruction of function; while as a matter of fact, the sympathetic inflammation shows a remarkable tendency to stay on the outside of the chorio-capillaris, attacking the retina in the earlier stages, either not at all, or only in small isolated spots, except in unusually severe or exceptional cases.

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*The auto-anaphylaxis with lens substance reported by Krusius (A. f. Augenheilk, 67, 32), has been disputed by Römer and Gebb (A. f. Oph. 81, 392).

Another stumbling block is the occurrence of sympathetic optic neuritis. The difficulty of explaining a neuritis as the result of a sensitization of the uveal pigment: which Elschnig* insists is organ-specific and not species-specific: is met by him with the assumption that many, if not all the cases of uncomplicated sympathetic neuritis are the results of nasal or accessory sinus disease: and while this may possibly apply to some cases, too many of us have seen severe and well marked cases of sympathetic ophthalmia begin with inflammation of the optic disc, to believe that neuritis is not frequently an essential part of the disease. As to the occurrence of sympathetic optic nerve atrophy: although the original case of Rosenmeyer turned out later to be one of malingering: if we admit that a sympathetic neuritis of the second nerve ever exists, the occurrence of atrophy should not surprise us, and I personally have had two cases of sympathetic ophthalmia following cataract extraction, in which the second eye became absolutely blind, with such slight symptoms of inflammation in the anterior part, that inflammation and atrophy of the nerve were, in all probability the cause of the blindness.

As to the existence of the auto-intoxication or constitutional anomaly which Elschnig postulates: it is my own experience and, I think, not an unusual one, that the disease is quite apt to attack happy, healthy country children and young men in robust health. Elschnig of course would say that we have no right to say that an individual is healthy just because he seems so, without having tested him with the finer chemical and biologic methods of diagnosis, but the results of such tests for auto-intoxication, especially the indican test which has been chiefly used by Elschnig, are so conflicting, that little reliance is to be placed upon them in the face of a perfectly clean bill of health, as shown by ordinary methods.

As a therapeutic consequence of his belief in anaphylaxis, Elschnig recommends the most minute examination of every phase of the patient's health, and believes that his adherence to this plan explains the entire absence of sympathetic ophthalmia from his clinic for a number of years. If adherence to Elschnig's theory led to no therapeutic consequence other than more careful examinations of the condition of the patient in sympathetic ophthalmia, it certainly would not have lived in vain; but I think that it would be unfortunate if his adherents should follow another of his suggestions, namely, that enucleation of the exciting eye can be of no use after the sympathetic ophthalmia has once broken out. I believe it would be a great misfortune if any large proportion of the profession were to act on this suggestion, which even on the anaphylactic theory, I consider to be unjustifiable. I believe that the first eye should be enucleated, in sympathetic ophthalmia, whenever there is no reasonable prospect of its obtaining useful vision; no matter whether one believes in the microbic or the anaphylactic theory. It seems to me easily conceivable that the retention of the first eye might injure the chances of recovery in the second, even if the disease be anaphylactic, by furnishing fresh accessions of antigen to the circulation.*

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*Elschnig (A. f. O. 81, p. 363), after explaining that experiments under Bail's supervision have shown that brain substance has no anaphylactic action in rabbits, says: "Nerve substance apparently produces no specific albumen reaction, and we can therefore exclude it as a participant in anaphylactic phenomena."

The question of treatment raises the consideration that the value of one sort of treatment or another in sympathetic ophthalmia may furnish an important clue as to its etiology Some years ago I was led to try atoxyl in the disease, on the theory that it was probably of protozoic origin and a similar thought has led Cecil Price Jones and Browning[7] and others to use salvarsan, with encouraging results. If subsequent experience should show salvarsan to have anything like a specific effect upon the disease, the fact certainly would not be without influence on our ideas of the etiology of sympathetic ophthalmia. The beneficial influence of mercury and urotropin also point in the direction of a microbic origin. Of the way in which salicylic compounds act in this disease we know too little to draw any immediate conclusions, but their effect upon sympathetic ophthalmia is so marked that if a corresponding usefulness in proved forms of anaphylaxis should not occur, this too would raise a suspicion against the truth of Elschnig's theory.

An interesting point has been raised by Peters[8] who, in reporting a case of suddenly occurring deafness, in connection with sympathetic ophthalmia, suggests that this may be an anaphylactic phenomenon, due to sensitization of the pigment in the labyrinth. On this theory, it would be certainly difficult to explain the extreme rarity of this sequence, as the case of Peters makes only the seventh of which there is any record. The occurrence of slight delirium in a number of these cases speaks more for the theory of Leber and Deutschmann, and here it seems worth while to mention the suggestion of Domann[9] that a lumbar puncture be made in cases of sympathetic ophthalmia, to determine whether the disease is really accompanied by a slight meningitis. In closing the discussion of the anaphylactic therory, the words of Morax are not inappropriate. At the last international congress she remarked: "We may admire the ingenuity of the conception, but we should not forget on how weak a foundation the theory is built."

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*Although these arguments against Elschnig's theory occurred to me, as they must have done to many others, on first hearing it, I find on looking the matter up that many of them have already been advanced by E. V. Hippel (A. f. O. 79, 3) and Reis (A. f. O. 80, 1).

Microbic Theories.

Turning now to other theories, if we keep firmly in mind two stubborn facts, namely, the evidence of the microscopic picture in the fully developed cases, and the overwhelming preponderance of penetrating wounds as a cause, I think we must admit that the microbic theory is still the most promising one. Of the various microbic theories, that of Leber and Deutschmann has fallen into discredit, and unjustly so. For if we assume that the sympathetic ophthalmia germ has an especial affinity for the choroid, a supposition which the supporters of the metastatic theory also find most convenient, the slight evidence which most specimens show, of the passage of germs by way of the optic nerve, is not hard to explain. A large proportion of the specimens of the first nerve show more or less infiltration of the ocular end of the nerve decreasing as we pass away from the globe. In the sympathetic eye the affection of the nerve is also found chiefly close to the globe. This is what one would expect from a germ showing only slightly pathogenic properties toward the nerve but still able to live within it or its sheaths. In the first eye, the most marked signs are found near the globe because there is where the chief supply of germs is to be found, while in the second nerve the germs which reach it from the cranial cavity are hurried down to the globe by the regular lymph stream in the intra-vaginal space. The tolerably frequent cases in which the sympathetic trouble first shows itself as an optic neuritis, are hard to explain except on the supposition that the germs in some cases, reach the second eye through the nerve or intra-vaginal space. This, however, may well occur without the intervention of the nerve of the first eye, since they may reach the cranial cavity by way of the lymph channels of the orbit. To reach these channels in the first orbit, the germs may either leave the first nerve with the blood vessels as pigment-granules and anthrax bacilli have been found to do; or from the anterior chamber along the blood-vessels; or they may pass out of the ball with the veins and nerves that penetrate the sclera from the choroid, as the cell-infiltration, in sympathogenic eyes, has been found quite regularly to do.

In this connection, the remarkable paper by F. Deutschmann[11] which appeared in 1911 should be mentioned. It will be remembered that thirty years ago the work of R. Deutschmann[13] gave such apparently convincing proof of the passage of the ordinary pus germs from one eye to the other, by way of optic nerves, that the mystery of sympathetic ophthalmia was thought to be definitely settled, and the von Graefe prize was awarded for the achievement. These results however, were not confirmed by other workers. Now F. Deutschmann appears with a paper which twenty-five or thirty years ago, would have seemed even more convincing. Tissue from sympathogenic eyes was inoculated into apes and rabbits; producing what the author calls typical sympathetic ophthalmia. The exudate was followed to the second eye by way of the optic nerves and chiasm. Gram-positive diplococci were found in the exudate, at various points along the route; and successful cultures were made from the same. The experiments mount up into the hundreds and the results of a vast amount of experimental and literary work are displayed, unfortunately some of the bacteriological statements are so unusual and the conclusions announced are so positive, and so out of proportion to the pathological findings; that in view of the wide differences which the results display, from those of other investigators, one can not help regarding the work with great skepticism. Nevertheless, leaving out F. Deutschmann's bacteriological conclusions, the results which he obtained with the inoculation of sympathogenic tissue into the eyes of apes and rabbits are certainly noteworthy, if they can be confirmed, and come nearer to the production of artificial sympathetic ophthalmia than anything hitherto obtained.

Sympathetic ophthalmia is not a disease which is propagated from case to case, hence the germ can not be obligatorily pathogenic. Like the tetanus bacillus, it only occasionally has the chance to do harm. In the main it probably leads a harmless, uneventful life in the conjunctival sac and the naso-pharyngeal tract, as do the pneumococcus, the staphylococci and the xerosis bacillus. When, however, it gains access to the eye, there is no need of supposing that its mode of transmission to the other eye is always the same. The pus germs we know generally spread by continuity or by the lymph streams, but we also know that they occasionally break into the blood-vessels and spread by metastasis.

Therefore, I can not see why it should be necessary to limit ourselves, in the explanation of sympathetic ophthalmia, either to the migration or the metastatic theory. I can not see why the germ can not, in different cases, or perhaps even in the same case, reach the second eye partly by way of the general circulation and partly by the lymph-channels, or even by way of the venous anastomoses as suggested by Motais, and further urged by Gilbert.[12] The latter points out that the veins of the two orbits communicate over the bridge of the nose by way of the ethmoidal veins, through the nasal septum and over the crista-galli, and through the circular sinus. He urges that with the venous engorgement which occurs during inflammations of the eye, it might be that an extra amount of blood would follow one of these courses to the opposite orbit. The main objection to the theory is that even if germs could follow this course into the other orbit they would, in all probability, be carried away from the second eye as soon as they reached the larger vessels.

With regard to the endogenic theory of Meller,[13] who supposes that the germ is of common occurrence in the blood, and that the infection of the first eye is from the blood-stream, it is not improbable that the germ may occasionally get into the blood-stream and in this way it may cause the sympathetic ophthalmia which occurs with intraocular sarcoma, or those forms of idiopathic iridocylitis which show the typical anatomical picture of sympathetic ophthalmia, but the theory that this is the ordinary mode of entrance, blinks the practically constant occurrence of the disease after penetrating wounds, as opposed to non-penetrating ones.

One weak point in the ordinary germ theory of sympathetic ophthalmia has always been its occurrence after non-penetrating ruptures of the sclera with or without dislocation of the lens. It is true we have slid over this difficulty by assuming that there were at the time of the accident imperceptible breaks in the conjunctiva, but as this had never been proved many of us have felt a trifle guilty at accepting so simple an explanation. The last year, however, through our experience with one of the most beneficent operations ever invented, has given us direct proof of the passage of germs through the apparently intact conjunctiva. I refer to trephining of the limbus according to Elliot. Along with the almost unanimous chorus of praise with which operators have greeted this operation, there have come occasional reports of secondary infection through the apparently intact but somewhat bulging conjunctiva which covers the hole. These infections have come so long after the original operation that they raise no possible question of faulty technique. They are probably merely demonstrations of the slight irritation to which a bulging area of the conjunctiva is exposed by the movements of the eyes and the lids. They are so exceptional that they in no way mitigate against the practically universal adoption to which the operation seems destined, but with its increasing popularity, I shall be much surprised if sympathetic ophthalmia is not reported as the result of some of these infections, unless Col. Elliot, or some one else can teach us how to avoid them.

It may seem, at first thought, strange that the marked affinity for the uveal tract, which both the metastatic and the optic nerve theories of sympathetic ophthalmia demand of its germ, should be present in a germ which only exceptionally gets a chance to grow in the eye. But for this the tetanus-bacillus again furnishes a parallel, showing as it does the most marked predilection for nerve tissue, although normally an inhabitant of the soil. Or if preferred, we may suppose, as I suggested some years ago, that the germ acquires its special power of attacking uveal tissue, through the natural selection in the struggle for existence which it has with the cells of the first eye.

A word as to the occurrence of sympathetic ophthalmia in the form of lymphocytic nodes. Does this grouping offer any support for the metastatic theory? That a vessel is not infrequently observed in the center of such a group can hardly be thought significant, since, if the group were the result of a microbic embolism it would hardly occur in a vessel of such size. Are we to assume, moreover, that the germs reach the circulation in such quantities that after running the gauntlet of the general circultaion, enough are left to simultaneously plant numerous foci in the second eye? If so, the first eye must be subject to the same dissemination, and we must regard the similar groups which occur there, as the result of a secondary reinfection from the general circulation. Against such an idea, the occurrence of the perfect picture of nodal choroiditis in the first eye, without sympathetic ophthalmia, of which Fuchs[15] gives such a beautiful example, speaks most emphatically. These considerations, together with the almost invariable freedom of the chorio-capillaris, warrant us in throwing out the grouping of the cells as an argument for metastasis

Such a paper as this could hardly be finished without reference to the remarkable conclusions of Fuchs.[16] I say "conclusions" advisedly, because, after a careful examination of the evidence, I can not escape the conviction that the work of Fuchs, on sympathetic ophthalmia, has received much more credit than it deserves. I believe that the most important facts brought out in his paper are not new, and that his most important conclusions are open to dispute. The undisputed facts are that the fully developed picture of sympathogenic inflammation is entirely different from that observed in ordinary traumatic infections. It consists essentially of a nodal or, in the later stages, of a diffuse infiltration with great thickening of the uveal tract with small, round, mono-nuclear cells,* with the frequent occurrence of epithelioid and giant cells. This infiltration has a tendency to pass out along the choroidal vessels to the outer surface of the globe, and shows a marked tendency to spare the chorio-capillaris. He also regularly observed the occurrence of plastic exudate on the surface of the iris and the ciliary body, while the choroid showed little or no tendency in this direction. Now all of this had been abundantly shown by others, especially by Schirmer,[17] Uhr,[18] and Ruge.[19] The most striking point in Fuchs' paper was the fact that out of 200 eyes enucleated for various causes he was able to pick out 35, of which, without knowing their histories, from the microscopical or, sometimes, from the microscopical findings alone, he was able to say, these are sympathogenic eyes (i. e. they have caused sympathetic ophthalmia), and the event proved him to be correct in all but one case. The dramatic effect of this, together with his statement that none of the other eyes were found to have caused sympathetic ophthalmia, was naturally immense, and most subsequent investigators, on finding the above described picture, have referred to it as "the conditions described by Fuchs" when in my estimation the appellation "Schirmer, Uhr and Ruge" would be decidedly more just. The most important new points, in Fuchs paper were, first, his contention that a characteristic picture was always found in sympathogenic eyes, and that this picture was practically never found anywhere else; second, his conclusion that the plastic exudate on the ciliary body and iris, which he and others constantly find in the first eye, does not belong to the picture of sympathetic ophthalmia, but is the result of a mixed infection. Regarding his first contention, many good men agree with him, but their negative results as to the occurrence of sympathetic ophthalmia without the typical picture, can not be held to disprove the positive results of Ruge, Gilbert, Watanabe[19] and Elschnig,[20] who have found intermediate forms between the sympathogenic inflammation and that which frequently occurs in non-sympathogenic eyes, and Fuchs' own words show that they are correct, for he admits that both the giant cells and the epithelioid cells may be lacking in sympathogenic eyes and that in the early stages the only characteristic thing is the nodal infiltration with lymphocytes, which has, without question, been observed by other men in cases without sympathetic ophthalmia, as well as in eyes with anaphylactic inflammations, or with the ferment inflammation of Guillery. The second assumption of Fuchs, that the tendency to fibro-plastic exudate, on the iris and ciliary body, must be the result of mixed infection, is based on the fact that the tendency to plasticity rarely shows in the choroid, and *on his statement* that the few eyes with sympathetic ophthalmia which have been sectioned, show that while the plastic inflammation may occur as the result of the sympathogenic inflammation, it does so only exceptionally and in especially severe cases of infiltration.

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*It should be noted that F. Deutschman and Jane McIlroy (cited by E. V. L. Brown; Journal of Oph. and Oto-laryngol, 1911, p. 36) contend that the bulk of the infiltration in sympathetic ophthalmia is made up of plasma cells. Domann also insists on the constant presence of these cells. As pointed out by Brown, the discrepancy between these conclusions and those of earlier observers may be explained by the fact that the eyes examined by the latter were mostly preserved in Müller's fluid, which renders it difficult or impossible to make out the characteristics of the plasma cells.

The evidence of the second eye on this point is certainly of the greatest value, because in it a mixed infection can generally be ruled out, and if the inflammation in such eyes practically never showed any tendency to plasticity, it would be a strong point in favor of Fuchs' contention. An impartial examination of the records shows however, that of the ten sympathetic eyes considered by Fuchs as a warrant for the above statement, together with another described by Ruge, four showed no plastic exudate, three showed it to some extent, while four showed it to a marked degree.* This evidence from the second eye together with the fact that in the great majority of cases of sympathetic ophthalmia, the plasticity of the iritis is marked, certainly has little to say in favor of Fuchs' claim.

Domann indeed (loc. cit), after examining twelve sympathogenic eyes, holds that plastic exudate, with specific characters, on the surface of the ciliary body, is characteristic of the later stages of sympathetic ophthalmia, and that where mixed infection occurs it shows itself in the mixture of polynuclear leucocytes.

Furthermore, if the plastic exudate which is always found in sympathogenic eyes is the result of a mixed infection why does not Fuchs demonstrate, at least in an occasional case, the extraneous germs. And even if we admit that these germs are, like that of sympathetic ophthalmia, invisible to our present optical resources, is it in the least likely that in every case of sympathetic ophthalmia the offending eye is infected with at least two kinds of germs?

Finally a word as to the nomenclature of the subject.

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*I include in the sympathetic eyes with marked plastic exudate, the eye figured by Schirmer (Graefe-Saemisch, p. 116), although Fuchs includes this in the eyes without plastic exudate, on the ground that Schirmer does not mention such exudate specifically and because he (Fuchs) thinks the figure does not show any. The fact is that the figure shows very plainly a marked layer of exudate on both surfaces of the iris and on the surface of the lens; and on my writing to Schirmer about it he has kindly sent me a description of the eye from the proceedings of the Heidelberg Congress in 1900, in which "abundant, partly organized exudate, on the iris and ciliary body" is mentioned.

Many years ago, I have not been able to find out just when, some Italian or Frenchman started the perverse practice of describing the injured eye, as the sympathizing eye, and the second, or really sympathizing eye, as the sympathized eye. This custom did not make much headway for a number of years, but in Schirmer's* first important paper on the subject, he unfortunately introduced it to the Germans, and as most of the important literature on the subject since then has appeared in German, the English-speaking peoples are the only ones left to use "sympathy" and "sympathizing" in their original and proper significance. I consider the Continental method incorrect and perverse, because I can find no warrant for using either the Italian "simpatizzare" or the French "sympathiser" as transitive verbs. In ordinary usage, the French, Italians and Germans use these verbs as we use sympathize, and Hirschberg's dictionary gives the words in the English sense. The question is, what are we going to do? If this perverse custom would simply stay out of our tongue it would perhaps not be worth while to bother about it, but it will not stay out. With the increasing number of English-speaking oculists, who read and sometimes even think in ophthalmological German, the danger of falling into the Continental method is great, and in English abstracts of Continental articles, written by men imperfectly acquainted with the niceties of the English tongue, the tendency in the same direction is still greater. I think some attempt to reform the Continental practice should be made at the next International Congress, on philological as well as on historical grounds, and I think it should be made by the British, because they laid the foundation of our knowledge of the subject and gave the disease its name. But the case is so bad that I believe the attempt to reform the Continental practice is hopeless, even if it is taken up by the International Congress. Meanwhile, I think the English-speaking ophthalmologists should take some action. Besides agreeing on definite terms for the designation of the first and second eye, we must adapt some new term to designate the inflammation which in the first eye causes the sympathy of the second. The term "sympathogenic" which I have used for this purpose, seems to me to meet the requirements, but the essential thing is that something definite be decided upon, or we shall find ourselves in the pass of being afraid to speak our own language in the proper way, lest we be misunderstood by foreigners.

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*Schnabel (Wien Med Woch. 30, 1902), protesting from the German standpoint against Schirmer's terminology, says: "Following this practice wounds the spirit and form of our language and obscures its meaning." Elschnig, also, regrets its introductoin.

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REPORT OF A CASE OF GLIOMA OF THE RETINA IN A JAMAICAN TWO YEARS OLD.*

By D. F. Reeder, M. D., Chief of the Eye and Ear Clinic, Ancon Hospital, Ancon, C. Z., with Pathological Report by Dr. S. T. Darling, Chief of the Board of Health Laboratory, Ancon Hospital, Ancon, C. Z.

Glioma is the only neoplasm of the retina according to Fuchs. It is found only in children mostly before they attain the age of 12 years, and is known as amaurotic cat's eye. Amaurotic, because the eye is blind, and the peculiar reflex noticeable is like the reflex in the cat's eye.

The course of the tumor shows three distinct stages. In the first stage, inflammatory symptoms are absent: the disease manifests itself by a light colored reflex and blinding of the eye. The second stage is characterized by increased tension. The eye becomes irritated and painful and the child begins to suffer. In the third stage, the tumor grows out along the optic nerve and also perforates through the cornea or its vicinity, transferring the eye into an ulcerative mass which is painful and bleeds easily, while the globe projects out between the lids. In the fourth stage the tumor spreads through the internal organs, finally causing death by involvement of some vital organ or by pressure on the brain.

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*Read before the Medical Association of the Isthmian Canal Zone.

The course of the disease usually runs several years before a fatal termination occurs. As a rule glioma only attacks one eye. The case reported herewith is bilateral.

Case Report.

C. H., Jamaican, age two years, admitted to Ancon Hospital on November 23, 1912. Had been blind all his life, so far as the parents know, and the last two months the right eye had enlarged and protruded between the lids, finally ruptured through the cornea, producing a large bleeding cauliflower-like mass. The left eye was a little bit enlarged and had a peculiar reflex associated with this disease. The tumor could be seen in the retina filling about two-thirds of the globe of the eye. The child does not complain of pain. There is a nodule on the forehead on the right side, showing involvement of the structures of the brain.

On November 25 the right eye was enucleated, not with the idea of saving the patient's life, but simply to rid him of a large bleeding mass and make him more comfortable.

On December 5 it was decided to enucleate the left eye, as it had become more enlarged and painful. This was done and a specimen is shown herewith. (Fig. 1.) Later, metastasis developed in the glands of the neck and also protruded up through the skull, as is shown in photograph herewith. The growth also returned in loco, but more marked in the left orbit than in the right. In the two photographs shown herewith, the small one (Fig. 2) was taken after the enucleation of the right eye and before the enucleation of the left; the large photograph (Fig. 3) was taken a few days before death and after the enucleation of the left eye. The child seemed to have no more pain, but the tissues in the orbit gradually increased in size and protruded well out between the lids.

Metastasis was found to have occurred in the skull and periosteum, dura-mater and optic tract, submaxillary and cervical lymph nodes, liver and pelvic lymph nodes.

At death the child was very much emaciated and anaemic. The immediate cause of death was probably pressure in the brain, the child apparently dying from respiratory failure.

The only treatment for this condition is early enucleation, cutting the optic nerve as far back as possible. If the disease has not gone beyond the bounds of the eyeball, a cure may be expected, and has been reported in the literature. But it is exceedingly likely to occur again, both in loco and by metastasis.

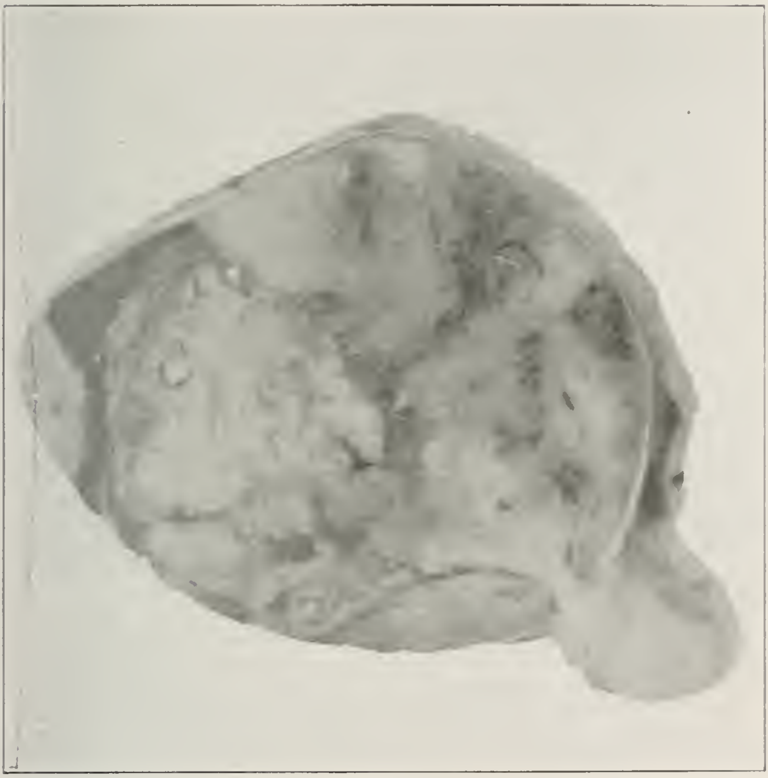

Fig. 1.

There has been a great deal of discussion of the histo-pathology of this growth, many pathologists claiming it is sarcoma on account of attacking such organs as the liver and lymph nodes. According to Virchow, the distinction between glioma retinae and intra-ocular sarcomata, is in the pigment. Glioma is never pigmented. It is developed from the two granular layers of the retina and is composed of small cells and a very soft basement substance.

That the tumor has many characteristics of sarcoma can not be denied. Dr. de Schweinitz reported a case which he called glioma-sarcoma, which is probably the correct terminology for the neoplasm.

Pathological Report.

Autopsy No. 3361. A tremendously emaciated male negro child. The left side of the neck has a baseball-like tumor mass which has apparently extended into the right parotid gland, for the latter is enlarged, definitely outlined and continuous with the tumor mass.

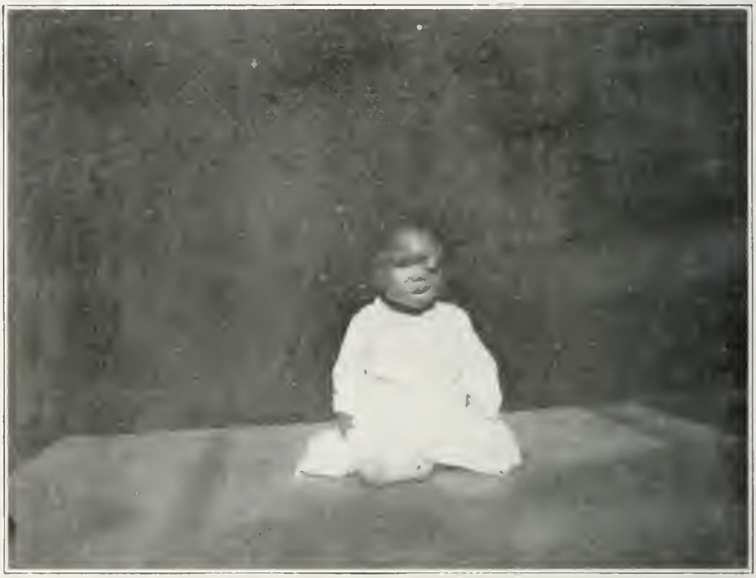

Fig. 2.

Both eyes are missing, but tumor tissue has grown so that masses the size of and shape of tennis balls protrude from each orbit. Over all the various bones of the skull are large tumor masses, about 5 cm. in diameter, and 2.5 cm. thick. They are cystic. The left frontal region fluctuates and the index finger can be introduced into the cranial cavity through the coronal suture.

Head Section: When the scalp was reflected, a pink turbid cellular fluid escaped. All the tumor masses were confined to the periosteum, except at the suture lines. Here the Bone margins and the surfaces were involved for radial-like neoplastic bone tissue exuded from the line of suture. The bone at the coronal sutures had separated about 1 cm. The bones of the skull were reflected in the usual manner exposing large circular metastatic masses attached to the dura-mater. These averaged 3 cm. No brain lesion was found other than that in the optic nerve. The right optic nerve was 1 cm. in diameter, the left one 5 mm. in diameter. There was marked

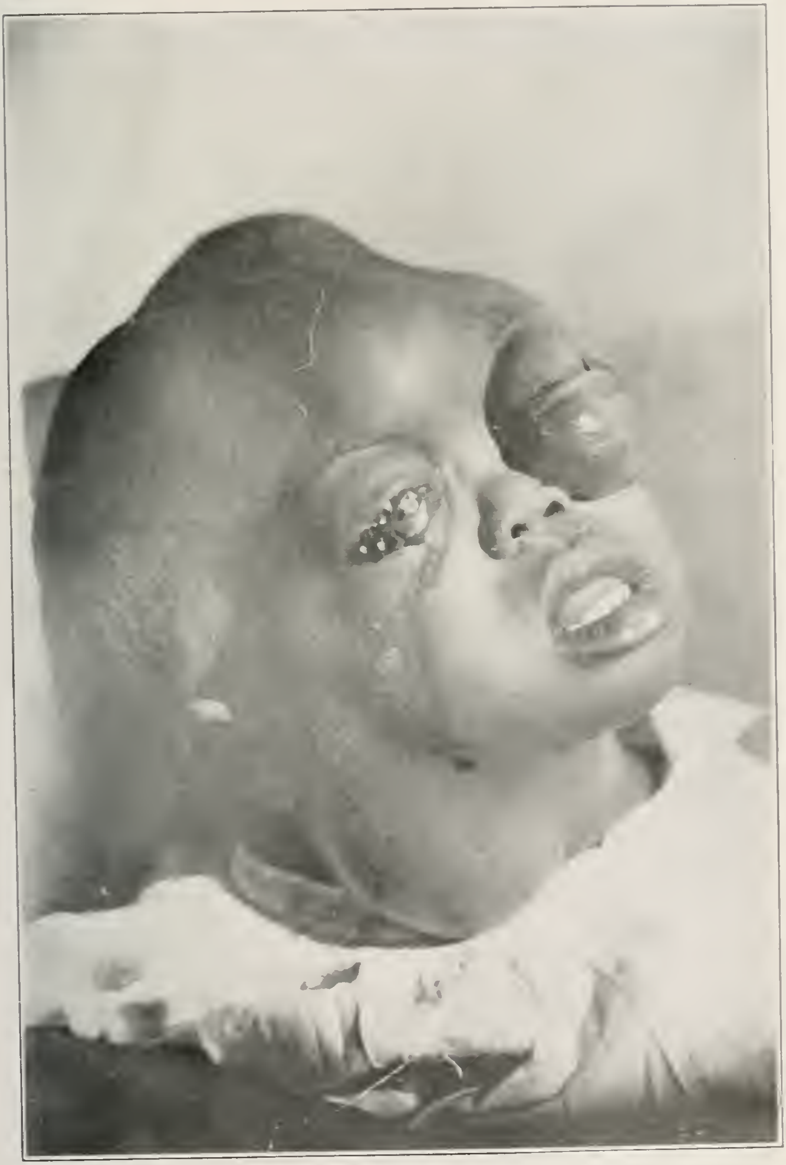

Fig. 3.

compression of the frontal lobe, by a growth crowding upon it from the roof of the left orbit, and vertical portion of the frontal bone. The occipital lobes and the cerebellum were compressed.

Neck: A large mass already mentioned on the right side of the neck and in the right parotid, seems to be made of fused lymph nodes. There is compression of the common carotid on this side. The larynx and thyroid gland are normal.

Thorax: Lungs and heart are normal.

Abdomen: There is slight peritoneal effusion. The entire colon occupied the right lower quadrant of the abdomen and the descending colon was attached along the spine to the left of the aorta. The mesocolon (transverse) was so long that it was on a level with the umbilicus. The only normal attachment of the large bowel was that of the caecum. A Meckel's diverticulum was found 30 cm. above the valve. It had a bicornate distal end and measured 4 cm. in length and 1.5 cm. in diameter.

The pelvic and inguinal lymph nodes contained tumor metastasis.

Liver: There was one metastatic nodule 1 cm. in diameter in the dome of the liver and another 2.5 cm. in diameter on the posterior surface of the right lobe at the junction of the inferior and axillary surfaces. Gall bladder and ducts normal. Kidneys and stomach normal.

Pancreas: The terminal half is represented by a thin string of pancreatic tissue.

Internal and external genitalia normal.

Smears from spleen: Some phagocyted malarial pigment.

Smears from marrow: Some pigment.

Smears from liver metastasis: Cells resemble a type of marrow cells.

Weights of viscera: Brain, 1100 grams. Liver, 495 grams. Right lung, 85 grams. Left lung, 70 grams. Thyroid, 5 grams. Pituitary, 0.235 grams. Right kidney and left kidney, 85 grams. Spleen, 30 grams. Heart, 50 grams. Thymus, 2 grams.

Anatomical Diagnosis.

Glio-sarcoma of orbital tissues, bilateral.

Glio-sarcoma of orbital skull and perisotium.

Glio-sarcoma of orbital dura-mater.

Glio-sarcoma of orbital the optic nerve.

Glio-sarcoma of orbital the submaxillary and cervical lymph modes.

Glio-sarcoma of orbital, pelvic and inguinal lymph nodes.

Effusion, slight into the cranial, cardiac, pleural and peritoneal cavities.

Mal-position of large bowel.

Meckel's diverticulum.

Atrophy of thymus gland.

Emaciation.

Anemia.

Cause of Death: Cancer and other malignant tumors of other organs, and of organs not specified.

Surgical Pathology. No. 4690.

Right Eye—The vitreous has been replaced by a grayish yellow mass of varying consistence in which lime salts had been deposited, here and there in a granular form. The neoplasm had penetrated the sclera at one place.

Left Eye—The vitreous has been replaced by gray and reddish masses varying in consistence. It is apparent that the grayer and more translucent portions of the neoplasm have in part grown into the vitreous through the optic nerve and in part from the retina directly oposite. There was no invasion of the sclera as in the right eye. Section A. The section shows the sclera inclosing a compact mass of round cells resembling the granular layer of the retina, although the retina itself has completely disappeared. The round cells of the neoplasm have very little cytoplasm, and special staining methods do not disclose any glia cells, although it is very likely that the tissue was not recent enough for this purpose.

There is a small amount of delicate reticulum supporting thin-walled blood sinuses scattered through the neoplasm. Here and there are suggestions of the radial arrangement of cells around vessels said to be typical of gliomas. The growth has broken through the sclera at one place, but this has the histological features of the tissue inside the sclera. Altogether, the picture is that of a glio-sarcoma.

Section B. The granular portions of the tumor apparently containing lime salts are seen to be made up of large collections of large round cells in which lime salts have been taken up. The stroma supporting these cells is highly myxomatous, and the periphery of the sections, just inside the sclera, shows considerable melanosis.

Section C. Cross-section of the optic nerve just behind the eye. Contains no nerve tissue, but is completely transformed into neoplasm generally resembling that described under "A." But the reticulum or stroma shows advanced hyaline changes.

Histopathology.

Autopsy No. 3361—The brain and the pituitary show nothing of note. The lungs are generally negative except for two tubercles of the hyperplastic type.

Thyroid—This is normal and shows ascini of the adolescent type.

Spleen—Negative save for malarial pigment. Pancreas, adrenal, heart muscle and tonsils negative: and pancreas with lymph node negative.

Parotid Gland—Several blocks of tissue show invasion by the neoplasm in the form of globular masses of cells, which have reached the gland, through the blood or lymph stream and not by contiguity. Other blocks of tissue show invasion chiefly by a process of migration and proliferation of cells obscuring to a great extent the structure of the gland. The parenchyma disappearing as though by phagocytosis or cytolysis, as in the periportal cellular collection in nurrina in the guinea pig.

Liver—The nodule is made up of alveoli containing many cells of the same type encountered elsewhere, but associated with them are many with mitotic figures. The alveolar walls stain faintly and are seen to carry thin-walled sinusoids filled with red blood cells. The columns of hepatic cells surrounding the nodule are very much thinned out from the expansion of the neoplasm.

Several blocks of tissue from the neoplasm show a diffuse infiltrating mass of cells with prominent nuclei of large size and with little cytoplasm. The nuclei are usually ovoidal in shape. There is much cellular necrosis here and there, and where the cells are diffusely infiltrating there is a tremendous number of cells with mitotic figures, and associated with them are many decayed eosin staining cells.

Other sections show masses of neoplasms as above, but with areas of hemorrhage, the latter coming in large, thin-walled blood sinuses. Altogether these last have the appearance of a proliferating angioma, in which both red cells and mononucleated cells are found, the latter proliferating within the angiomatous alveoli, as is evidenced by the great number of mitotic figures.

Other blocks of tissue show the neoplastic cells with a tendency to surround the blood sinuses in a rosette arrangement. There are also globular collections of proliferated neoplastic cells, which have undergone central necrosis.

Farmer, Moore and Walker, Proceedings Royal Soc. LXXII, 1904, have described heterotype mitoses in which the chromosomes of the resting nucleus are present in only half the number of those occurring in the rest of the dividing nuclei of the body. The forms of the chromosomes are strikingly different from those of other nuclei in that they produce figures resembling loops, rings, aggregations of four heads and so on. It is to be noted that many of the mitotic figures in the neoplasm described seem to correspond with these heterotype mitoses of Farmer, Moore and Walker.

DISCUSSION. Treacher Collins has shown that the cells of retinal glioma resemble the granular layers of the retina. But opinions differ as to the origin of gliomas, some believing that they should be grouped with the sarcomas, others believing that they should fall in with epithelial tumors. Adami believes, and I am inclined to agree with him, that the retinal tumors, while true gliomas, are formed of less differentiated cells and that it would be admissable to speak of them as glio-sarcomas.

It seems to be true that retinal gliomas exhibit more evident signs of malignancy, both in their capacity to invade the surrounding tissues and to give rise to metastasis. In our small series of brain tumors, which we have called gliomas, there have been no mestastatic involvements of other organs. In point of fact, one such tumor, believed to be a glioma, underwent such extensive retrogressive changes as to become almost completely transformed into a cyst.

The metastatic deposits of this neoplasm have the characters of a sarcoma and of a carcinoma; for example, the deposits in the liver were chiefly alveolar in arrangement, while those in the parotid are diffuse, infiltrating and sarcomatous in type.

Wilson and Thompson, Arch. of Ophthalmology, January, 1900, record a case of glioma of the retina, and brain metastasis at autopsy. In reviewing the literature they note that in a total of 530 cases, metastasis were recorded 61 times; and of these 7 showed involvement of the liver. The other organs usually involved are the cranial and facial bones, the brain, the lymphatic glands and the parotid glands.

From a pathological point of view, the interesting features of this case are the age of the patient, in this case corresponding with the observation that glioma of the retina occurs only during childhood; the histological features of the primary neoplasm; the metastatic involvement, for in this case the liver, inguinal and pelvic lymph nodes, submaxillary and cervical lymph nodes, the parotid gland, dura-mater, periosteum and skull became secondarily involved; the mixed character of the growth in metastasis, certain areas resembling carcinoma while others presented the features of sarcoma; the involvement of the other eye through the optic nerve; the duration of the disease.

SALVARSAN AND NEOSALVARSAN IN THE TREATMENT OF SYPHILIS WITH ESPECIAL REFERENCE TO DISEASES OF THE EYE.

BY ALEXANDER A. UHLE, M. D., AND WILLIAM H. MACKINNEY, M. D., PHILADELPHIA.

At a meeting of this society held two years ago, we had the pleasure of presenting before this section a paper upon the "Recent Advances Made in the Study of Syphilis." At that time attention was called to the discovery of the spirochaeta pallida; the experimental prophylaxis against the disease; its transmission to lower animals; and mention was also made of the discovery of a drug, then known as "606," since placed on the market under the name of "salvarsan," the use of which had led us to expect results in the treatment of syphilis nothing short of marvelous. Since then each of these discoveries has been subjected to the most careful scientific scrutiny, so that now many conclusions can be drawn relative to their accuracy and value.

The spirochaeta pallida is universally acknowledged as the cause of syphilis; it has been successively isolated and cultivated; it has produced the disease when inoculated into susceptible animals, and has been found in every lesion of acquired and hereditary syphilis. Recently, through the work of Noguchi, it has been demonstrated in the phases of the disease classified as parasyphilitic. The use of the dark-field microscope has made the demonstration of the spirochaeta pallida so easy, in the hands of a trained microscopist, that the positive diagnosis of an initial lesion uninfluenced by meddlesome treatment is the work of but a few minutes. The clinician of today who allows his patient to develop secondary manifestations, with their attending anemia, loss of weight, headache and pain, in order to confirm his suspicions as to the nature of an ulceration upon any exposed surface of the body, commits an inexcusable error.

The introduction of the sero-diagnosis, or Wassermann reaction, has thrown light upon a field of observation hitherto obscure. Its value as a diagnostic measure is undoubted, and no one would overlook its application in the determination of a cure. A point to which little attention has been called, and one upon which our experience during the last two years has led us to place considerable reliance, is the study of the quantitative Wassermann reaction in the prognosis and treatment of syphilis. While it is a little apart from the purpose of this paper, it may not be considered amiss if the results of these observations be briefly presented here. They may be summarized in the statement that while a patient with a positive Wassermann reaction has syphilis, the quantitative reaction tells us the intensity of the spirochaetal infection, and serves as an index to the intensity of his treatment. Thus, in the first few days of a chancre—varying, in our experience, from the sixth to the fifteenth day—the sero-diagnosis is usually negative. At this time, well directed treatment may, in the large percentage of cases, eradicate the disease. Twenty patients treated by us at this stage with salvarsan or neosalvarsan have remained well and have shown a continued negative Wassermann reaction for periods from six to thirty-four months.

After the reaction has once become positive, the quantitative Wassermann reaction offers the most reliable index to treatment; for to rely upon the general health of the patient and his freedom from lesions allows of considerable error.

What now may be said of that most discussed of all drugs, salvarsan? Many were the hopes and fears entertained upon its introduction three years ago; even now, the controversy as to the desirability of its use is by no means settled. The hope of its discoverer that it might prove to be a "*therapia sterilisans magna*" is universally acknowledged to have been unattained: and the question to be answered is simply. Does salvarsan accomplish enough to make worth while its application in the treatment of syphilis. and is its use unattended with danger in patients who present none of the well-recognized contraindications to its employment?

It is not our intention to collect from literature material for the purpose of discussing this question. With what has been written you are undoubtedly familiar. We desire here to report merely the results of our analysis of twenty-five hundred injections. given to about one thousand syphilitics. in all stages of the disease, and to draw conclusions from the records of about five hundred patients. who have been observed from periods of from three to thirty-four months.

To the first part of the question. "Does salvarsan accomplish enough to warrant its use in the treatment of syphilis?" we unhesitatingly answer, it does. Even the most bitter opponents to its use will acknowledge that the immediate effects. as manifested in the disappearance of lesions, the increase in body weight and the return of apparent health. are nothing short of marvelous.

In reply to the second part of the question. "Is its use unattended with alarming or dangerous consequences in the patients presenting none of the well-recognized contraindications?" we would answer that we have never observed such serious after effects as high temperature, marked headache. delirium, intense depression, violent vomiting, diarrhoea and anuria, where the injections were personally administered. These symptoms are now known to be due to the organic poisons in what was supposed to be pure water, and the absence of such reactions in our hands may be attributed to the fact that we have always employed freshly distilled water, or normal saline made from freshly distilled water, with strict asepsis.

The only unpleasant effects that we have been unable to eliminate are nausea, occasional vomiting, flatulency and diarrhoea. In three patients vomiting occurred during the administration of the drug; and in one of these who received three injections, vomiting occurred each time before more than ten cubic centimeters of the solution had been administered. Toxic erythema, with marked itching of the skin, was observed four times. In one patient it occurred after each of two injections; in another, a purpuric rash was seen after the fourteenth, fifteenth and sixteenth injection of neosalvarsan. Nausea and vomiting occur much less frequently when the injections are given on an empty stomach and food is withheld for eight hours after the injection.

The most important contraindication to the administration of salvarsan is nephritis, the urine showing albumin and tubular casts. Its cautious use in small doses is permissible in simple albuminuria with cylindroids, when this may reasonably be regarded as syphilitic in origin. The urine should be examined, not only before the first injection, but also before each succeeding injection; as fatal anuria more frequently follows repeated injections. We are fully aware that numerous deaths have been directly attributed to salvarsan, but we feel convinced that, if the kidneys are normal, if the dose is regulated according to the weight and age of the patient and if freshly distilled water is employed throughout, the solution being made for use immediately before administration—both salvarsan and neosalvarsan are safe drugs to employ.

What the remote effects following the administration of this drug may be, no one is in a position to say; but of this much we feel assured, that in its immediate effect, mercury in no form or method of administration can compare favorably with either salvarsan or neosalvarsan. Before the introduction of this drug into use at the Philadelphia General Hospital, one of the richest of institutions for the study of syphilis, the physician was never at a loss for material with which to demonstrate to the students cutaneous syphilis in all its phases. Today, on the contrary, we are at a loss for such material, although the admissions for syphilis have not diminished in number.

As to the relative value of salvarsan and neosalvarsan in the therapy of syphilis, we would state that we have been able to note but little difference in efficiency between the two drugs. The intravenous method of administration, we believe, is to be preferred to the intramuscular.

Of the total number of patients treated, sixty-two (62) were referred to us for injection because of syphilitic diseases of the eye and its appendages. Of these cases, we have sufficient data to report fifty (50). From the synopsis that you have before you, you will note that these cases include one chancre of the eyelid, ten cases of interstitial keratitis, twenty of uveitis, seven of muscle paralysis, four of optic neuritis and seven of optic atrophy. Of the fifty cases, the Wassermann reaction was positive in forty-five at the time of treatment: three had a negative reaction, and in two no reaction was recorded. Of the negative cases, the first was hereditary, the second had a definite history of syphilis of twenty years' duration, and the third, in a man of forty-six, presented a perforation of the palate and an Argyll-Robertson pupil. This patient's wife had had two miscarriages.

The Wassermann reaction has been classified as weakly positive, medium positive, and strongly positive, these classes representing, respectively, one-quarter to one-half unit, one-half to one unit, and one unit or over, in the quantitative determination. In twenty-three cases, mercury had been administered with potassium iodid, for periods varying from a few weeks to five years. Four patients had received previous injections of salvarsan, and a positive reaction was present in all.

The patient with a chancre of the eyelid may be recalled by a few present, as she was exhibited before the ophthalmic section of the College of Physicians some time ago. At that time, the spirochaeta pallida was demonstrated by the dark-field microscope. This patient received one injection, but neglected her after treatment. After a lapse of twenty-six months, she returned for examination, in response to a letter, and stated that she was perfectly well. At this time, her Wassermann reaction was negative.

Of the ten cases of interstitial keratitis, six were heredo-syphilitic, and four were acquired. In two patients, the keratitis was complicated with dacryo-cystitis. All received mercury (usually in the form of inunctions) and iodids. Six patients received salvarsan; and four, neosalvarsan. The immediate effects in these cases, as in other ocular conditions, were good. There was prompt relief of pain, photophobia, lachrymation and congestion. A good final result was obtained in all cases within from two weeks to three months. Interstitial keratitis is the most resistant lesion of the eye to antisyphilitic treatment. The clearing of the cornea is slow, but, as a rule, definite after each injection. This form of keratitis should be treated with repeated injections at rather short intervals. In the two cases complicated with dacryo-cystitis improvement in the dacryo-cystitis was most notable. Frequently, but slight improvement is observed after the first injection, but improvement follows each succeeding injection.

In acute syphilitic inflammations of the uveal tract, the results are astonishing. This group includes seven cases of papular iritis, six of acute iritis, and seven of general uveitis. The immediate relief from pain in these conditions is most gratifying, and what must be regarded as a good result was accomplished within two weeks in every case.

In one case of long-standing chorioretinitis complicated with an acute exacerbation, the process was stopped within a few days, and the general health of the patient considerably improved.

In muscle-palsies, a consistent improvement was noted within a few days, and with one exception, normal function was restored within a few weeks. One patient with a partial third-nerve paralysis, which cleared up almost completely after one injection, returned six months later, with complete paralysis. A second injection (intra-muscular) promptly relieved the ptosis; but a partial paralysis of the third-nerve still remains, which, however, is slowly yielding to inunctions, administered daily. One case of general syphilis developed oculomotor palsy two months after the last injection of a series of five, which had been administered within five months. Upon receiving a sixth injection, the muscle was restored to normal within two weeks. This patient has received seventeen injections, and has taken mercury and iodids almost constantly; yet, in spite of this very active treatment, he has suffered from skin and throat lesions on two occasions subsequent to his ocular disturbance.

In optic neuritis, the results are uniformly good, the nerve clearing up within one month in all cases. One patient with optic neuritis had received one injection of salvarsan for an iritis seven months previously, and had neglected subsequent treatment. A second injection brought about considerable improvement in three weeks, and a cure in five weeks.

In seven patients with optic atrophy, no improvement in the nerve was noted, nor was the same to be expected. In two cases associated with tabes, the pains were relieved, and the gait and station somewhat improved.

In summarizing the results, we observed that salvarsan and neosalvarsan constitute remedies of considerable value in the treatment of syphilitic lesions of the eye and its appendages. The immediate effects are uniformly good and, in our opinion, more prompt than can be obtained with mercury alone. It must be remembered that mercury and iodid of potash were used very extensively, in conjunction with salvarsan and neosalvarsan, in the treatment, and no especial credit is given to the one over the other, the paper simply illustrating results as they have been seen by the ophthalmologists under whose direction the injections were given, and to whom we are greatly indebted for their care and the courteous assistance that they have given in the preparation of the paper.

We further desire to thank Dr. John L. Laird and Dr. B. B. Vincent Lyon for the report of the Wassermann reactions upon these patients.

In conclusion, it must be borne in mind that syphilis of the eye is only one of the many manifestations of the disease, and that the object sought is not only the cure of lesions, but also the eradication of the infection, which can be brought about only by persistent treatment over an extended length of time, and ultimately determined by repeated Wassermann reactions.

THE HARD PLUG METHOD OF CONTROLLING HEMORRHAGE DEEP IN THE ORBIT, AS ILLUSTRATED IN A CASE OF ANEURISMAL VARIX.

BY H. GIFFORD, M. D., OMAHA, NEBRASKA.

The following case seems to me worth reporting both on account of its unusual character and the method of controlling the bleeding, which it necessitated.

The patient, a healthy man of 32, came to me June 25, 1906, with the history that two years before he had got some lime into the left eye, after which the sight of the eye was not quite so good as before; the eye seemed more prominent than normal and a small bluish spot appeared in the skin just below the left lower lid at the inner side. This caused no trouble, but inasmuch as during the last few months the spot seemed to be getting larger, he applied to an oculist in the western part of the state. The latter undertook to excise the bluish spot: but he was met with such a terrific hemorrhage that he applied a ligature and a tight bandage and gave up the attempt. This was about two weeks before I saw him; after that the exophthalmos and the sight became much worse and he suffered much pain in the region of the eye. I found a partially healed wound at the inner side of the lower lid with marked ulceration of the cornea, and signs of beginning panophthalmitis. I sent him to the hospital and two days later, while the nurses were giving hot applications, there was a sudden severe hemorrhage from the wound in the lid. This was stopped by pressure, but recurred several times. I saw him at 5 p. m. on the same day and, upon removing the bandage a stream of blood about 1/8 of an inch in diameter spurted from the wound with a moderate pulsation. The jets were not sharp as from an ordinary artery, generally carrying the blood not more than two or three inches from the wound. Cutting down in this neighborhood, I found a dark, purplish vessel nearly 3/16 inch in diameter, which I tied. On July 3rd, as the condition of the eye was hopeless, I enucleated it, and found in the tissues below the lower lid a dilated portion of a blood vessel ¾ inch long by ¼ inch in diameter. This was removed and a vessel about ⅛ inch in diameter which led into it was followed back ¾ inch into the orbit and tied. After this there was no pain but the swelling of the lids increased greatly and, the lower especially, filled up with extravasated blood. The pressure in the lower lid became so great that the skin became gangrenous at one point, so on July 10th I reopened the wound, scooped out the blood clots, found the bleeding vessel again, followed back and tied off another ¾ inch of it. The cavity was tightly packed and a firm bandage applied, and frequently renewed. In spite of this another severe hemorrhage occurred after a few days; whereupon I eviscerated the orbit and on excising the tissues at the apex, came upon the same large vessel again. The bleeding from this vessel could be controlled by pressure on both carotids, and while this was done the orbit was again firmly packed. Following this there was no bleeding for six days, then twenty-four hours after the packing had been changed, a profuse hemorrhage again occurred. The mass of tissue at the apex of the orbit was so small that it was impossible to apply a ligature and the attempt to control the bleeding with the Paquelin cautery was fruitless, on account of the abundant hemorrhage, upon which, at this time, the pressure upon the carotids had no effect; therefore firm packing was again resorted to, but bleeding began again after two days. By this time the patient was becoming exsanguinated, and I had begun to get anxious, especially as there was no prospect of helping matters by tying the carotids. I therefore sterilized a cylinder of wood three-fourths inch in diameter and about three inches long, and after applying a swab of iodoform gauze dipped in Monsel's solution to the apex of the orbit, I pressed this firmly down with the wooden cylinder, then packed gauze firmly around the latter, and then applied a firm bandage, over which a second bandage of elastic flannel was applied. This outer bandage was removed and tightened up three times a day. After this performance I had no further trouble with hemorrhage, but the man for two days had so much pain in the head that I thought he was going to develop meningitis. The plug with the original gauze packing was changed after four days and ordinary iodoform gauze without the Monsel's solution was used, with the hard plug, for ten days longer.

The subsequent course was uneventful, except that healing was delayed by a small area of necrosed bone, resulting doubtless from the free applications of the cautery. The severe head symptoms which followed the use of the plug were probably due to an extension of the thrombosis to some of the cranial sinuses.

This is the only case of aneurismal varix in the orbit, which I have seen; and the most probable explanation for its occurrence, is that some traumatism had occurred which the patient either had forgotten or wished to conceal.

The method of controlling orbital hemorrhage by a hard plug, long enough to allow the pressure of the bandage to be applied directly to its outer end, proved invaluable in this case, but it can hardly have a very wide range of usefulness, since my colleague Dr. Patton and I, have had to use it only in two other cases since 1906. Both patients in these cases were bleeders upon which eviscerations of the eye-ball had become necessary. Perhaps the method may occasionally be of use in abdominal surgery.

TABLE INSTEAD OF A CHART FOR THE TONOMETER.

E. C. ELLETT, M. D., MEMPHIS, TENN.

The chart sent with the tonometer is so troublesome to read that it seemed to me it would be an advantage to write it out in the form of a table, and since doing so the tonometer has become even more of a comfort than before. The table is self-explanatory and consists of the readings of the chart furnished with the Gradle modification of the Schiotz Tonometer, for one, two and three weights, and for intra-ocular tension of from 1 to 88 mm. This table can be printed or typewritten on a piece of paper small enough to fit in the top of the box in which the tonometer is packed. No doubt many have already had such a table written out, but a few may, like the writer, have been laboring with the chart.

	1	2	3
1	68	78	88
2	63	72	81
3	57	66	74
4	52	60	67
5	47	54	61
6	42	49	55
7	37	43	49
8	32	38	43
9	28	33	38
10	24	28	33
11	20	24	28
12	17	20	24
13	14	17	20
14	11	14	16
15	9	11	13
16	7	8	10
17	4	6	8
18	2	3	5
19	1	2	3
20	1		

TWO USEFUL REMEDIES IN TREATMENT OF DISEASES OF THE CONJUNCTIVA.

R. L. THOMSON, SPOKANE, WASH.

Xeroform when applied to the conjunctiva is non-toxic and non-irritating. It possesses to a marked degree the quality of causing absorption of adventitious tissue. I have cured three cases of vernal catarrh by the application of the dry powder to the diseased surfaces twice a day.

These were typical cases with tough gristly projections from the under surfaces of the lids—the projections being flattened and glazed with deep furrows between. One of these cases I saw ten years after it was discharged as cured. There had been no recurrence and the conjunctiva was normal. Another case I saw five years after being discharged as cured and the conjunctiva was normal.

I removed a pterygium from an eye three times and it returned after each operation. The application of Xeroform caused the growth to disappear.

Xeroform is one of the best remedies I have ever used in the treatment of true trachoma.

Tannic acid dissolved in glycerin without the aid of heat is much more effective as a remedy than the solution made by its application. My method of preparing it is to fill a bottle with the powder and then pour in all the glycerin the bottle will hold. Let it set for twelve hours, then invert the bottle for twelve hours more.

This is the most effective remedy I have found for follicular conjunctivitis with pannus.

When imperfect drainage causes eversion with extensive thickening of the lower lids, in many cases the condition can be corrected by the application of this remedy twice a day and by softening and loosening the skin below the eyes by the application of lanolin and massage.

PERSISTENCE OF THE NERVE PLEXUS OF THE IRIS.

W. B. Inglis Pollock denervated the iris in albino rabbits by excision of the ciliary and superior cervical ganglia. After an interval of two weeks from the operation, in each case, histological examination showed that there remained a motor plexus with nerve cells, in both the sphincter and dilator pupillae muscles. This plexus was found to persist even after the complete separation of the iris from the central nervous system by the removal of the ganglia.

REPORTS OF SOCIETIES.

SYMPOSIUM ON GLAUCOMA. PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

November 13, 1913.

Pathogenesis of Glaucoma.

DR. WILLIAM ZENTMAYER.

The factors in intraocular tension are the fluids of the eye, the nerves controlling the secretion of these fluids, the channels of excretion. The fluids are the blood, the perivascular and the tissue lymph spaces, the aqueous and the vitreous. The channels of excretion are the spaces of Fontana, the ligamentum pectinatum, Schlemm's canal, the lymph spaces at the pole of the eye and the veins. Notwithstanding so many factors entering into it, the intraocular tension remains fairly constant under variations in these factors. So that increase in the secretion of the fluids can not be considered an important factor in glaucoma. The ciliary body and the anterior surface of the iris are concerned in the secretion of the aqueous. The results of pathologic changes in these structures and experimental study has made this quite certain. Changes may occur in the chemical composition of the aqueous and vitreous which retard filtration. Changes occur in the angle of the anterior chamber and also in the other channels of excretion which hinder the outflow. Some of these are: enlargement of the lens with age, and sclerosis of the vessels and of the sclerotic coat. Inflammation of the sympathetic nerve may be a factor in the production of glaucoma as irritation of the nerve produces much the same symptoms which accompany glaucoma, the division of the nerve produces the opposite conditions. Certain etiologic factors contribute to the pathogenesis of glaucoma. Age in the production of sclerosis of the tissues and enlargement of the lens, hyperopia in its association with smallness of the cornea and relatively too large lens, also in its resulting hypertrophy of the ciliary body from excessive accommodative act: grief and shock in dilating the pupil and altering the secretion.

Dr. Zentmayer then spoke of certain theories put forward to explain glaucoma which are based upon facts which should be considered at least as factors in the production of increased tension. Such are those of Fricker and Gilbert in which the cardio-vascular and vaso-motor systems are considered prime factors, that of Fischer, who ascribes it to a swelling of the colloidal substances in the eye due to absorption of water, and lastly to the recent work of Stronkonsky, who places the entire trouble in the sclera. Aside from the senile changes which contribute to simple glaucoma he assumes the existence of an indurative scleritis, which may be general or limited to the anterior or posterior segment. There is no increase in the tension in simple glaucoma, but there is a reduction in the size of the globe with a reduction in the size of the scleral opening and an extension of the inflammation to the lamina (part of the sclera) which increases its bulk. These two factors cause the lamina to become cupped. The conditions induced by scleritis favor the production of acute glaucoma.

In the absence of Dr. Posey, who was to speak on the "Use of Myotics in the Treatment of Simple Glaucoma," the following views were set forth:

In the presence of chronic simple non-inflammatory glaucoma (as determined by the vision, the tension with the tonometer, the ophthalmoscopic picture and the visual fields) myotic treatment at times preserves perfectly useful vision to the patient for many years. By this is meant sufficient strength in the myotic to keep the pupils well contracted. From time to time it will become necessary to increase the strength of the myotic solution. The custom is to employ pilocarpin during the day (anywhere from ½ to 5 grs. to the oz.), and eserin at bed time (anywhere from ½ to 3 grs. to the oz.). These solutions should be frequently prepared, filtered and dispensed in amber or blue bottles at least once in two weeks, and great care should be taken to wash the dropper after each instillation. Impure or contaminated solutions are likely to set up a conjunctivitis, necessitating a withdrawal of the myotic solution for a time.

In this way vision of 5/15 and over has been preserved to many patients for from 10 to 15 years, most of these being elderly people. Naturally the best results are obtained from this method in private practice where full co-operation is secured. In dispensary patients operation would therefore be generally indicated as also in young adults with chronic non-inflammatory glaucoma, say between 20 and 40 years of age.

Dr. Zentmayer and Dr. Reber agreed that this represented substantially Dr. Posey's views as to the value of myotics and the treatment of non-inflammatory glaucoma.

The Operative Treatment of Glaucoma.

Dr. Wendell Reber: In the present day operative treatment of glaucoma you have your choice of the classic iridectomy of von Graefe, of an anterior sclerotomy, a posterior sclerotomy, or one of the newer filtration operations, such as the Herbert operation, the Heine operation (cyclo-dialysis), Lagrange's operation or Elliot's operation.

The arguments for iridectomy are, ease and quickness of performance (in skillful hands), rapid healing, lessened liability to infection, usually freedom from complications in the healing and 50 years' records of good results in the majority of cases.

The arguments for iridectomy are, ease and quickness of the corneal section in the presence of a very shallow anterior chamber, the large extent of the incision (in some cases as much as 8 to 10 mm. in length), the danger of dislocation of the lens following sudden escape of the aqueous, the likelihood of presentation of the lens in the wound and vitreous escape. These three factors (large opening in the cornea, forward dislocation of the lens and vitreous escape) all favor hemorrhage in the vitreous because of the sudden release of the support which the intraocular vessels had enjoyed up to the time the eye was opened. The greatest argument against iridectomy, however, obtains in chronic, non-inflammatory glaucoma, in which the percentage of cures and improvements after iridectomy is not large enough to justify a conscientious surgeon in urging the operation upon a patient. It was for this latter class of cases, in which the vascular coat of the eye is notably degenerative, that sclerotomy was first proposed. It, also, was found insufficient because of too rapid closure of the lips of the two wounds. Herbert, therefore, after making his puncture and counter-puncture, as in ordinary sclerotomy, revolved his narrow Graefe knife in his fingers, thus making a jagged wound at the points of puncture and counter-puncture. To this he added a conjunctival bridge, and later modified it as his "Isolation-Wedge Operation." With the same idea in view, Lagrange began his incision like an anterior sclerotomy and carrying his knife up and through the sclera and conjunctiva, made a small scleral flap which was then turned forward. He then boldly cut off a piece of the sclera. To Lagrange will everlastingly belong the credit of being the first man with the courage to thus deliberately cut out a piece of the sclera.

Unfortunately, Lagrange's operation also creates a large opening in the cornea and it was while mulling these things over in mind that Elliot conceived the idea of trephining a small opening in the sclera at the uppermost portion of the angle of the anterior chamber. To me it seems that this is the best filtration operation thus far devised; it not only permanently reduces tension but does so without endangering the lens and without favoring hemorrhages in the vitreous, as does Lagrange's operation or the classic iridectomy of von Graefe. It is not quite as easily or as quickly performed as iridectomy but it should be done on an ordinary patient in from 10 to 15 minutes.

Moreover, in the vast majority of cases, it can be done under local anesthesia and this is no small matter. It is easier of accomplishment under local anesthesia if a preliminary hypodermic injection of morphia, grs. 1/4 and atropia grs. 1/150 has been employed. At first I employed it solely for the relief of pain in sightless eyes with absolute glaucoma, which it was formerly taught should be enucleated. Later I employed it in chronic simple glaucoma, and was so much pleased with the results that I have also resorted to it in acute inflammatory glaucoma. I am now of the conviction that it is equally applicable to any and all forms and phases of glaucoma.

Up to date I have done 27 Elliot operations. In two there occurred choroidal hemorrhages, but both of these were the subject of absolute glaucoma and I have the satisfaction of feeling that I did not have to do with the disastrous consequences that attend expulsive choroidal hemorrhages after iridectomy.

As to technique, I agree with Dr. McReynolds, of Dallas, Texas, in the use of the wedge-shaped small sharp cutting instrument for separating the conjunctival layer of the cornea when the limbus has been reached. This proceedure ought to shorten the operation by at least five minutes and in my opinion will ensure tapping of the anterior chamber in the vast majority of cases.

Finally, I feel that Elliot's operation for glaucoma is the safest one in the hands of the operator of small experience and if this be true it ought to logically follow that it is easily the safest operation in the hands of the skilled surgeon. Those who by years of experience are absolutely committed to iridectomy the sheet anchor of treatment in glaucoma point to 50 years of results from this measure. I am far from denying the great boon which iridectomy has been to humanity, but I am strongly of the opinion that 25 years hence the trephining operation for glaucoma will have absolutely justified itself.

Dr. William M. Sweet drew attention to the acute cases of glaucoma that come on in the middle of the night and in many of which there are premonitary symptoms before retiring, such as pain and discomfort in and about the eyes, accompanied with the halo phenomenon. It was his feeling that an iridectomy under general anesthesia with the keratome was the proceedure of election at this time in this class of cases. If the case could be seen after the very acute stage had passed, he would rather favor trephining. He also alluded to glaucoma seen after cataract operation and graphically pictured the differential diagnosis.

Patients with chronic simple glaucoma generally appear in ophthalmologists' offices with one eye pretty badly used up as to vision and the other with beginning failure of vision. He would favor the myotic treatment of these cases tentatively, bearing in mind all the time that they may develop acute congestive glaucoma at any moment. In his judgment it would be poor surgical judgment to operate on both eyes at the same time. He would prefer to operate on one eye and wait at least an hour or two before operating on the other. In this way any tendency to disastrous choroidal hemorrhage could be watched and properly met. He spoke at some length of the filtration cicatrix and observed trenchantly that he was not at all alarmed by the presence of iris in the wound so long as it was covered with conjunctiva.

DISCUSSION. Dr. Zentmayer: I have often stated my position as to the indications for the employment of myotics and operations in the treatment of simple glaucoma and have nothing to add to it at this time. As to the trephining operation I do not see how we can pass final judgment on an operation so recently perfected when employed in the treatment of a disease with so chronic a course as simple glaucoma. I doubt not that at the end of a similar period of time after the introduction of iridectomy it stood as well as does trephining today.

I do not think anything is lost by using strong myotics frequently repeated for a period of 48 hours before performing iridectomy in acute glaucoma. The best time to operate is in the prodomal stage before the occurrence of the first congestive attack.

Cyclodialysis is a useful substitute for enucleation in absolute glaucoma and it is the operation of choice in glaucoma secondary to thrombosis of the central vein or marked angiosclerosis. The slow reduction of the tension after the operation is its valuable feature in these conditions.

THE READING OF MEDICAL SOCIETY REPORTS.

Medical men probably are not much given to reading the reports of society proceedings and discussions; the articles, especially of clinical cases, interest them more; for it requires more time and some patience to connect the abstract of a paper with its discussion and to give due weight to the views of each participant in the latter. It is, however, generally conceded that more is learned from the discussion than from the essay which gives rise to it.

The views of the individual vary with his personality, his experience and his knowledge, while the arguments pro and con throw many sidelights on difficult questions.

The OPHTHALMIC RECORD's new editorial secretary has secured the coöperation of its editors and collaborators in an endeavor to carry out a future policy of "more short, practical articles" which will lend a new interest to the forthcoming issues of the journal. However, the society reports will, if possible, appear in still more carefully and fully edited form, and it is the hope of the staff that the readers of the RECORD will find both reports and articles edifying and timely.

Moreover it is also hoped that they will support in every way this new departure of a journal now entering upon its thirty-first year of publication. F. B. E.

Ernest E. Maddox's experience contradicts the general idea that sutures should not be allowed to pass across the cornea. He finds that there is no ill result from their presence if they are previously waxed to render them smooth and non-adhesive. As a result of this observation he has devised a new operation for the treatment of conical cornea. It consists in excising a bilanceolate piece from the cone, after which a flap of conjunctiva, previously prepared and threaded, is drawn over the cornea in such a way that its tension will be at right angles to the long axis of the gap.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Samuel G. Higgins of Milwaukee is studying in Breslau this winter.

Dr. Frederick Bentley of Seattle has removed to his new quarters in the Cobb building.

Dr. Chas. W. La Fever has been appointed oculist to the Mt. Sinai Hospital, Philadelphia.

Dr. A. B. Middleton of Pontiac, Illinois, left on January 1 for Vienna for six months of study.

Dr. David Fiske, who has been ill for several weeks, is steadily recovering at his home in Chicago.

Dr. H. M. Dunlap of Battle Creek, Mich., has suffered an injury which necessitates the removal of one eye.

Dr. Christian R. Holmes has been installed as dean of the medical department of the University of Cincinnati.

Dr. U. S. Bird of Tampa, Florida, is chairman of the section of ophthalmology in the Southern Medical Association.

Professor Ernst Fuchs of Vienna has been made an honorary Fellow by the Royal College of Surgeons of England.

Dr. Carl H. von Klein, a distinguished Egyptologist, translator of the Papyrus Ebers, died in Chicago on December 12, 1913.

An effort is being made to include consideration of the subject of conservation of vision and prevention of blindness in the program of the Twelfth International Ophthalmological Congress, which will meet in St. Petersburg in 1914.

Dr. William Waldrop was recently appointed oculist to the Elizabeth Duncan Memorial Hospital, Bessemer, Alabama.

The provisions of the Workmen's Compensation Act in England have been extended to cover cases of glassworker's cataract and miner's nystagmus.

A noteworthy event in modern provisions for the instruction of the blind is the series of readings being given at the Chicago Public Library and some twenty of its branches at intervals throughout the present year.

Dr. John McMullen, U. S. P. H. S., has been detailed to study the methods of treatment of trachoma in the New York and Philadelphia hospitals, preparatory to a campaign against trachoma and the establishing of an additional hospital and dispensary in Kentucky.

INTERNE WANTED.

Eye, ear, nose and throat interne in large general hospital situated in the middle West. Term of service is one year of exclusive eye, ear, nose and throat work. Applicants are requested to send full particulars regarding their qualifications in first letter. Address Ophthalmic Record.

The death of Dr. S. Weir Mitchell of Philadelphia is learned with peculiar regret by American ophthalmologists, for to this eminent neurologist and author is due the distinction of first emphasizing and, in conjunction with his colleagues, who were more directly concerned with ophthalmology, proving the intimate connection between errors of refraction and functional nervous disorders.

At the Chattanooga meeting of the Academy of Ophthalmology and Otolarynology the following officers were elected: President, Dr. J. M. Ray of Louisville, Ky.; first vice-president, Dr. J. M. Ingersoll of Cleveland, Ohio; second vice-president, Dr. C. B. Wylie of Morgantown, W. Va.; third vice-president, Dr. D. C. Loughery of Clarksburg, W. Va.; secretary, Dr. L. M. Francis of Buffalo, N. Y.; treasurer, Dr. S. H. Large of Cleveland, Ohio; councillors, Dr. Allen Greenwood of Boston and Dr. Samuel Iglauer of Cincinnati. The 1914 meeting will be held in Boston.

WANTED.

An assistant. A young man. A graduate in medicine, who desires to learn eye, ear, nose and throat work from the bottom up. Address

A. B. Middleton, M. D.,
Pontiac, Illinois.

NEW BOOKS.

Trachoma and Its Complications in Egypt. By A. F. MacCallan, M. D., Cambridge, F. R. C. S., England, director of Ophthalmic Hospitals, Egypt. Also published in Arabic by the National Printing Press, Cairo.

Cloth. 74 pages. Cambridge: at the University Press, 1913.

Genito-Urinary Diseases and Syphilis. By Edgar G. Ballenger, M. D., Adjunct Clinical Professor of Genito-Urinary Diseases, Atlanta Medical College; Editor Journal-Record of Medicine; Urologist to Westley Memorial Hospital; Genito-Urinary Surgeon to Davis-Fisher Sanatorium; Urologist to Hospital for Nervous Diseases, etc., Atlanta, Ga., assisted by Omar F. Elder, M. D. The Wassermann Reaction by Edgar Paullin, M. D. Second Revised, 527 pages with 109 illustrations and 5 colored plates. Price $5.00 net. E. W. Allen & Co., Atlanta, Ga.

E. Merck's Annual Report of Recent Advances in Pharmaceutical Chemistry and Therapeutics. 1912:: Volume XXVI. E. Merck, Chemical Works, Darmstadt, 1913.

The edition is limited and is distributed principally among the teachers of materia medica and therapeutics, and medical and pharmaceutical libraries. Generally, however, a few copies of each issue are left over after this special distribution, and physicians and pharmacists who make early application can obtain a copy by remitting the forwarding charges of fifteen cents, in stamps—no charge being made for the volume itself.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P. G.) G. W. Mahoney (Poli.) R. B. Stephenson (P. G.)	*Geo. F. Suker (P. G.) C. H. Francis (Poli.) A. Duncan (P. G.)	W. F. Coleman (P. G.) S. M. Hager (Poli.) H. N. Lyon (P. G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P. G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P. G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
2 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) M. Frank (E. M. D.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P. G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P. G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P. G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
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ORIGINAL ARTICLES

A FURTHER REPORT ON PARINAUD'S CONJUNCTIVITIS.

Report of New Cases with Microscopic Findings.*

Illustrated.

GEORGE F. KEIPER, M. D., LAFAYETTE, IND.

At the Cincinnati Meeting of the American Academy of Ophthalmology and Oto-Laryngology, in 1910, I reported a case of Parinaud's conjunctivitis and made it the basis of a review of the literature of that rare disease up to that time, appending thereto a complete bibliography of the subject embracing sixty-six reports.

Since that time a number of new cases in forty new reports have been recorded and it has fallen to my lot to have seen two more cases of the disease and to have excised the granulation in one and to have had it submitted to microscopic examination.

The disease is evidently very rare. In a recent visit to Vienna, in both the Dimmer and Fuchs clinics in the Allegemeine Krankenhaus, those in charge informed me that they had never seen a case of Parinaud's Conjunctivitis.

Etiology.

The question as to its etiology remains as obscure as ever save for what is to be reported in this paper. It will be remembered that Parinaud believed that it was due to contact with animals especially of the bovine type. Up to 1910 this view was much disputed. In one of my new cases there was no opportunity for such contact while in the other there was, though a careful inspection of the animals on the place with the able assistance of Professor Craig, head of the department of Veterinary Science of Purdue University failed to reveal anything as to a probable cause along that line. Pechin (Soc. d'Ophth. de Paris, 1910, p. 29) reported a case in which a dog is supposed to have been the cause of infection. Parasotti (Annal d'Oculist. cxliii. p. 143) reports two cases of this disease. In one the disease showed itself after infection from a scraping of uterine carcinoma. Suda (Nippon Gankakai Zachi. June 1910) reports a case in which the infection is supposed to be due to a cat.

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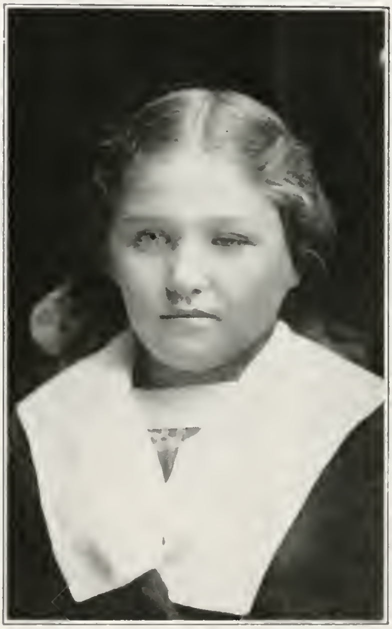
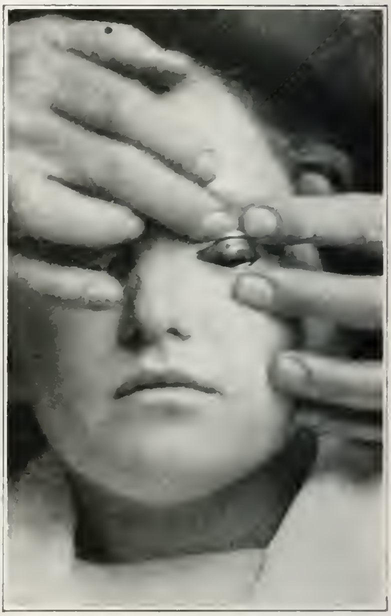
*Read before the Section of Ophthalmology of the American Academy of Ophthalmology and Oto-Laryngology at Chattanooga, Tenn., Oct. 27th to 29th, 1913.

All cases so far observed have been in the Caucasian race save one reported by Krauss and Boyle (Annals of Ophthalmology xix. p. 52). Their case occurred in a negro child.



Case 1: Rachel P. Shows the adenopathy and the swollen condition of the eyelids on the left side of the face and head.



Case 1: Rachel P. Shows the huge granulation on the everted upper lid of the left eye.

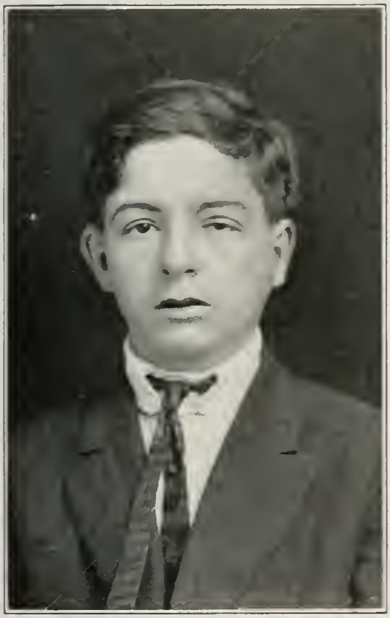
Symptomatology.

The patient's appearance is quite characteristic. The disease is always unilateral. But one report exists as to a bilateral case. The eyelids are swollen and heavy. On eversion the conjunctiva of the upper lid is found to be the seat of a large granulation sometimes involving the entire conjunctival surface. The granulation is pedunculated as a rule.

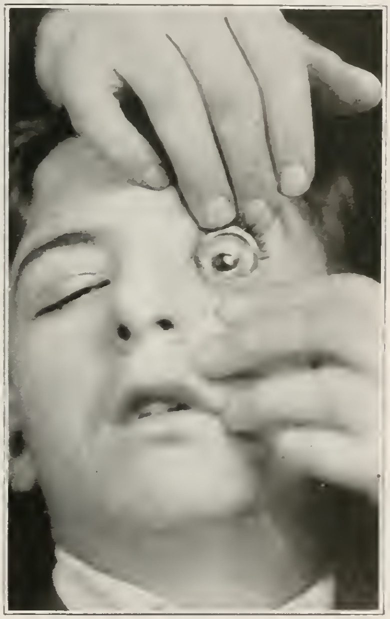
At times the ocular conjunctiva may be chemotic so much so as to completely hide the cornea, as in an extreme case reported by Pechin (Soc. d'Ophthalmol. de Paris, 1910, p. 29) Two of my cases showed marked chemosis.

There is usually but little discharge from between the swollen eyelids.

The concurrent adenopathy embracing all of the lateral glands of that side of the face and some of the adjacent glands of the neck is also characteristic and together with the condition of the eye, make up the main symptomatology of Parinaud's conjunctivitis.



Case 2: Frank M. Shows the adenopathy of the left side of face and head. Note the swollen eyelids and chemosis.



Case 2: Shows the chemosis covering a large portion of the cornea.

The glands become quite large at times and it would seem that suppuration must ensue. But when punctured no pus is found or if present in but very small quantities. With the subsidence of the eye trouble the glands become normal.

The temperature is but slightly elevated, rarely going over 100 degrees Fahrenheit.

Otherwise the patient appears to be normal.

Pathological Anatomy.

The gross changes are those enumerated under the head of symptomatology above.

Histologically different writers disagree. For example Verhoeff and Derby (Arch. of Ophthal. July 1904) found the lesion to consist of an infiltration made up of phagocytic and lymphoid cells with marked cellular necrosis. Parasotti (Annal d'Oculist. cxliii, p. 143) reports in one of his cases that the excised tissue showed "epithelial hypertrophy and necrosis, principally plasma cells which surrounded and in places penetrated the blood vessels, which caused the author to think that they were in part white blood cells." In one of my cases I excised the granulation and submitted it to Prof. H. R. Alburger of the department of Pathology of the University of Indiana, who reports as follows:

"Parinaud's Conjunctivitis.

In only a small portion of the sections in series is the surface epithelium seen and then is somewhat thickened and the cells are swollen and in some instances vacuolated and without nuclei.

"Beneath the surface we find a highly cellular tissue made up of a reticulated framework containing many cells and capillaries. The framework is partly of old connective tissue (relatively old, that is, in that the tissue is more fibrous than cellular), the fibres of which show marked evidence of hyaline degeneration, and partly of actively growing, newly formed connective tissue made up principally of spindle cells and very delicate fibres. All of this tissue is very loosely arranged, the fibres crossing each other rather than lying parallel, and the intercellular as well as interfibrous spaces are large as though the tissue were edematous. The blood vessels are not so conspicuous as in ordinary granulation tissue but are empty and for the most part characterized by a wall of two or more layers of plump endothelial cells also suggestive of cloudy swelling and edema. The cellular elements of the interstitial tissue are small round cells of the type of lymphocytes, having scanty protoplasm and a deeply stained nucleus, usually round or oval, occasionally lobate. A few plasma cells are seen but practically no polymorphonuclear leucocytes.

In the Archives of Ophthalmology, July, 1913, Verhoeff of Boston describes an hitherto undiscovered organism that may be the cause of the disease. He found it in eleven of his own cases. It is a fungus formation. Alburger thought that he saw practically the same in my own sections but Verhoeff could not find them, neither could Warthin and Novy, of the University of Michigan. The latter found numerous cocci in the sections which neither Verhoeff nor Alburger found.

Rosenbach (Arch. f. Augenheil. lxxii, p. 162) reports four cases of this disease of which two were chronic tuberculosis of the conjunctiva, corroborated by histologic examination, experiments on animals and biologic reaction.

Stern (Central bl. f. p. Augenheil. xxxvi. p. 321) regards the disease as a form of attenuated tuberculosis of the conjunctiva. Implantation experiments were successful after previous iridectomy. The disease healed rapidly under tuberculin.

Meisner (Zeit. f. Augenheil xxvii, p. 127) also regards it as tubercular in origin.

Krusius and Clausen (Arch of Ophthal. xlii, p. 165) in reporting two cases of this disease sum up their experience as follows: "From the present and experimental view of the genesis of the human phlyctenule, it can be taken for granted that it is not itself tuberculous, but it is a local reaction to various specific injuries to the eye in a body which has been previously infected by tuberculosis." Transplantation experiments in both their cases failed to show tuberculosis.

Cassell (Arch of Ophthal. xli, p. 29) reported a case wherein the Von Pirquet and Wassermann tests were negative. A culture was also negative.

Bacteriologically nothing characteristic has to date been found save by Moeller (Deutsch. Med. Wochenschr. 1912, No. 44) who reports that he obtained pure cultures of human tubercle bacilli from his cases. Even in those cases which seem to be tubercular in origin and character and which produced lesions in animals, after transplantation of affected tissue no tubercle bacilli have been found by others. Neither has the characteristic histologic tubercular tissue been found.

In the other two of Rosenbach's four cases noted above, one case was due to the pneumococcus (Fraenkel-Weichselbaum) and the other was a chronic trachomatous process with secondary infection with the Koch-Weeks bacillus.

We may find in investigation of future cases that the disease that we now call Parinaud's conjunctivitis may be resolved into several distinct types as the result of histologic and biologic examination.

DIAGNOSIS: The syndrome of symptoms, the unilateral swelling of the eyelids and of the glands of the face and adjacent neck, together with the peculiar granulation of the palbebral conjunctiva, and moderate rise of temperature, makes the diagnosis easy. No other disease presents such an array of signs and symptoms.

PROGNOSIS: All cases to date have recovered with no damage to vision. No recurrences are reported. The reports indicate that it takes from two to six months to effect a cure, and Vadja (Zeit. f. Augenheil. xxiv. p, 532) reports an extreme case wherein it took eighteen months to effect a cure. In all my own cases cure was effected in less than five weeks.

TREATMENT: Since some reports seem to show a tubercular origin, tuberculin has been added to the list of remedies for the cure of the disease. In all my own cases I made daily application of a two per cent solution of nitrate of silver to the everted eyelids. The patient was given the following prescription for home use:

℞

Zinc Phenolsulphonat.	gr.i.
Acid Boric.	gr.x.
Aquae Dest.	oz.i.

Sig: Drop two drops into the eye every hour.

The patient is also instructed to bathe the eye every hour for five to ten minutes with water as hot as the back of the hand will stand. To the enlarged glands dry heat continuously applied seems very agreeable. Internally calomel is given to thoroughly clean out and sterilize the bowels. Also quinine sulphate to combat the moderate fever.

Where possible the granulation had better be excised.

REPORT OF MY TWO NEW CASES:

Case 1:—Rachel P., school girl, aet. 10, was referred to me on September 18, 1912, by her physician, Dr. J. N. Shafer of this city. Fifteen days before she and her family noticed a lump in the cheek of the left side of the face and in front of the ear. Five days thereafter the eyelids became inflammed; then the other glands of the face and adjacent neck. Eversion of the upper eyelid revealed a large granulation which I excised and immediately sent to Dr. H. R. Alburger for examination with the result as reported above. The child's temperature was 99.4 degrees Fahrenheit. It never rose above that point. The enlarged preauricular gland seemed as if fluctuation was present but puncture by Dr. Shafer revealed nothing. The cornea and iris remained normal. Bacteriological examination revealed the leptothrix reported above.

On October 3rd, she was dismissed cured. Photographs of her condition accompany this paper.

Case 2:—Frank M., Aet. 16, school boy was referred to me December 4th, by Dr. J. N. Shafer, his physician. One week before this date he noticed that the left eye became slightly inflamed and two days thereafter the left preauricular gland was swollen. Later all the adjacent glands became likewise. The parotid gland was especially tender.

His eyelids were swollen and heavy. When the upper lid was everted, the conjunctiva seemed to be one immense granulation, and pedunculated. The bulbar conjunctiva was quite chemotic and hiding a considerable portion of the cornea, as the accompanying photographs of him show. The cornea was clear and remained so. The iris was not in the least affected. Lachrymation was moderately profuse. The patient's temperature was slightly elevated, but never passed 100 degrees Fah.

Bacteriological examination was negative. Both smear and culture examinations were made.

The treatment of the case was as outlined above. On January 8, 1913, he was dismissed cured. There was no opportunity for animal infection.

AN UNUSUAL COMPLICATED CASE OF SPHENOIDAL ABSCESS CAUSING AMBLYOPIA.

BY C. M. HARRIS, M. D.

Ophthalmologist and Otologist to Conemaugh Valley Memorial Hospital, Johnstown, Pa.

On May 5th, 1913, Mr. G. F., aged 59, came to me with the information that during the preceding 5 weeks his vision in the left eye (his remaining serviceable eye) had gradually diminished until he was greatly inconvenienced: not being able to read or to obtain benefit with any glass. During childhood he had suffered a blow on the nose causing some deformity and at another time the right cornea was penetrated by a piece of wood causing blindness in that organ, but no other subsequent symptoms. His nasal breathing had been poor for a long time, and for some weeks he had noticed a left periorbital and temporal "neuralgia." He and his friends suspected sympathetic ophthalmitis.

Examination showed that vision in the right eye consisted of ability to see movements of hand at 6 inches; vision in left eye was 6/22.

The right eye had been the subject of a horizontal corneal wound through which the iris had protruded, producing an anterior synechia and a distorted pupil on healing. Cataract was present. The eye was perfectly quiet and free from inflammation.

The left eye showed an active pupil and beyond a haziness of disk and retina with abnormally dark retinal veins, no positive lesions could be detected. Gross tests revealed no central scotoma and no attempt was made to outline the "blind spot." Feeling convinced that sympathetic ophthalmitis was not the correct diagnosis, the nasal passages were next examined. Pronounced deflection of both the bony and cartilaginous portions of the septum to the left, was present with polypi on the same side filling all available space.

At the next sitting the polypi were removed with some of the underlying ethmoid which was diseased. Within a few days the vision had improved to 6/12, but in about three weeks had diminished to 6/15. During this time sphenoidal abscess having been suspected, repeated efforts were made to enter the sphenoidal orifice with a fine cannula. Entrance was successful on several occasions in spite of the obstructing septum and middle turbinate, but air pressure and irrigation failed to remove any pus. When the diminished vision was detected, the cannula was again passed and an unusually strong blast of compressed air brought forth a copious flow of thick pus. The orifice proved to be extremely small and only a strong pressure would drive out the pus, around the cannula. During the subsequent week the cavity was repeatedly irrigated and air cleansed, the vision remaining 6/15.

At this time (five weeks after his first visit) the septum was resected followed in a few days by resection of the left middle turbinate, underlying ethmoid, and the anterior wall of the sphenoid, which cavity was very capacious and contained polypi which were removed with curette and biting forceps.

The nasal parts were carefully treated during the healing and the sinus frequently cleansed, finally causing a practical cessation of pus and an absolute relief from the peri-orbital and temporal neuralgia. It can be reasonably assumed that the deflected septum was primarily responsible for the ethmo-sphenoidal disease through interference with drainage and ventilation.

Three months after the sphenoidal operation, the vision was still 6/15 but the fundus had lost most of its haze and there was less retinal venous stasis.

Ocular affection due to nasal lesions are today more often properly diagnosticated than some years ago, and this is not by any means an isolated case; but the writer feels justified in reporting the same on account of the peculiarity associated etiological factors and wishes to emphasize the importance of rhinology in its relation to ophthalmology.

A SET OF NEW LACRYMAL PROBES.

BY WALTER BAER WEIDLER, M. D., NEW YORK CITY.

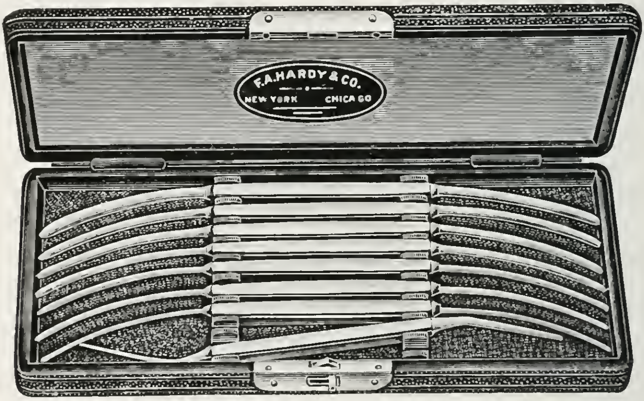
The passing of a lacrymal probe for obstruction in any portion of the lacrymal apparatus has a great many difficulties to an experienced hand but more especially is it true with the beginners in ophthalmological practice.

The latter starts as a rule, with more or less uncertainty of mind, as to what he is going to be able to do.

Many times it is found difficult or even impossible to make the probe enter the bony portion of the lacrymal canal, after getting the tip of the probe well into the sac. The passing of the probe from the puncta to the sac is a very simple matter and very many times I have found that this is all that is necessary to relieve the epiphora, which brings a great many of our patients to us.

This part of the dilatation of the lacrymal apparatus is as I have said a very simple procedure and in many of the cases is all that is necessary and I wish to emphasize this point more especially for those who have not done a great deal of this sort of work. Thus it will be found that the painful and much dreaded probing can be made a relatively simple procedure. We can at least content ourselves with this limited degree of probing for a week, or ten days until we have satisfied ourselves as to the results obtained.

If one is clever enough in his finger tips he can detect the location of the stricture during the passage of the probe and thus can we be doubly sure of the wisdom of the limited degree of dilatation. My object in making this form of a lacrymal probe was to overcome the difficulty often met with in lacrymal probing with the old style of probes. In attempting to pass the usual form of Bowman's or Theobald's probe, and this is more especially true of the smaller sizes, the probe will twist about in the fingers as we elevate the probe to a vertical position to make it enter the bony canal, after we have it well in the sac and we feel the tip resting in the lacrymal groove of the lacrymal bone. This is, as we all have experienced the most difficult part of the operation, and as has been said we may lose control of the position of the point of the probe, and thereby make a false passage along the bony canal, or as sometimes happens the probe may be pushed along the floor of the orbit, or again as I have seen, the probe may fall from the fingers entirely.



It is my opinion that a great deal of the difficulty experienced in the passing of the probes is due to the handles or lack of a proper handle on all of the lacrymal probes. The handle or "grip" made on the Bowman or Theobald is too small and unfitted for a comfortable holding of the probe. If an attempt is made to grasp the probe tightly, we only cause a cramp of the fingers and the back of the hand and thus render our tactile sense more uncertain and our grip really more insecure and unreliable.

The probes which I present for your consideration and criticism have a very great advantage in possessing the regulation handle of many of the ophthalmological instruments which we use daily, thus making it easier to handle and control.

This sort of a handle gives three or more points of contact, thus making it quite a simple matter to readily balance and maintain complete control of the instrument. It does not require "gripping" in order to secure an assurance of control.

The pointed tip of the Theobald probe has been adopted in this instrument, and has the advantage of effecting an easy entrance to the puncta. I have found it possible to pass one and two size larger probes with the new form probe than I was able to do with the old Bowman or Theobald, without the slitting of the puncta and the canaliculi. The pointed and dull dilator which are included in the set of lacrymal dilators, make the dilatation of the smallest puncta a simple matter, and here again the handle is of great assistance and satisfaction to the experienced and more so to the inexperienced and untrained fingers of the beginner in this sort of ophthalmic work.

In the passing of the lacrymal probe I would recommend a most careful adherence to and faithful use of the technique as follows:

1. Dilate the puncta with pointed dilator if necessary and follow this with the use of the dull dilator.
2. Enter the tip of the probe selected in an absolutely vertical position.
3. The probe is then allowed to assume an absolutely horizontal plane and is pushed along the canal until the lacrymal bone is felt.
4. Then again elevate the probe to a vertical positoin in the axis of the bony canal and with gradual, gentle pressure the probe is slowly carried through the bony canal into the nose, always keeping the numbered side of the probe towards the operator.

The probes are made by Hardy & Company to whom I wish to express my thanks at this time for their kindness and patience.

This set of probes and an abstract of this paper were presented at the Section of Ophthalmology, at the New York Academy of Medicine, December 15th, 1913.

SOME OBSERVATIONS DURING A RECENT TRIP TO EUROPE.

BY J. SHELDON CLARK, M. D., FREEPORT, ILLINOIS.

A trip of adventure or exploration, or indeed so simple a journey as that taken by the local delegate to a Sunday School convention seems hardly complete without some allusion being made to the incidents of interest that are ever engaging the eye and ear of the traveler. During the past summer many of our colleagues in the medical profession found their way to Europe as is their annual, bi-tri-quad or quintennial custom. This year the Congress at London drew a large number of medical men from the United States. In point of scientific interest the highest was attained, and as for entertainment of the guests, nothing was left undone that might have been thought of which would have added in the slightest to the greater enjoyment of those attending. These were the pink teas for pale people, the receptions, banquets and balls ad infinitum.

The purpose of my trip was a course of study in the clinics of Berlin, and Vienna. Upon our arrival at Berlin we found that everyone that could afford it was over in London attending the Congress and so we lost no time but hastened on down to Vienna; that city of ever changing kaleidescopic interests. We found the Viennese a very hospitable people and there was a spirit of freedom from care that permeated the very atmosphere and could be distinctly felt by the new-comer. True upon reaching your hotel you are handed a card that asks you some very pertinent questions as to your name in full, your year of birth, birth-place, your present residence, your business, your religion, and such questions that at first rather cause one to "back up a bit" and question the audacity of the police department, but on second thought one complies with the "request" and condescendingly scrawls out what he feels is his own business, and as such should not be so lightly regarded. By this system it is said that the movements of all visitors, as well as citizens of the city are known to the authorities, and there are some redeeming features. One cannot easily disappear from sight under such surveillance as in our American cities, also one's acts are known, and it especially behooves him not to get into bad repute with the porter or janitor of the pension where he may be stopping, for it is this dignitary that sits in judgment in many instances where a man needs a recommendation as to his mode of living. It has been said to me that when a man goes up for promotion in any walk of life; one of the first men asked as to the candidate's fitness for the place is the porter of the building in which the aforesaid gentleman resides. As one doctor expressed it to me "I don't like to have myself in the hands of that dammed porter, but it behooves me to keep sweet with him or he can fix me." Another ruling that some foreigners think is a trifle irksome is the 10 o'clock closing law. All doors must be shut and locked at 10 o'clock at night. This includes store doors, windows, to all of which are fastened strong iron shutters, the closing of which makes a racket equal to heavy cannonading, also the doors of all apartment buildings. Anyone wishing admittance is compelled to pay the sum of 20 hellers before he can gain entrance. This is the fine for being out after the curfew has rung. The custom was inaugurated by Napoleon, and they have never seen any reason for changing it.

Vienna had an industrial exposition this summer, but it was not a very great success. Not being half as good as some of our State Fairs. They are coming to the belief over there that the exposition business has been worked overtime and I am inclined to the same opinion.

Speaking of exhibits, one of the best was that to be found at the banks of the Blaue Danube where the maidens of Vienna were wont to disport themselves in the limpid stream or bask in the sunshine and upon the sandy beach. For brevity those bathing suits have the rabbit's tail beaten to quite an extent. A one piece suit is the rule, and the nether extremities are seen in nature's truest outline, in other words no stockings are considered necessary.

The date of the foundations of the city of Vienna cannot be stated exactly, it is assumed that a Celtic tribe settled on the banks of the Danube before the time of our chronology. History has it that a Roman fort, called "Vindobona" was erected on the present site of the city in the first century after Christ, also that the Roman Emperor Marcus Aurelius died there in 180 A. D. It had a varied existence under the Romans, the Huns and the Gugii and was in 791 in the hands of Charles the Great. Then the Babenburg family took possession and under them the city began to flourish. In 1246 this house having been extinguished, Duke Frederick had a short period of power and then the city fell into the hands of Ottokar of Bohemia, who remained its sovereign till 1276, when Rudolph von Hapsburg occupied the town and founded the dynasty of the Hapsburgs. This family has since furnished more royalty, good and bad, for the thrones of Europe than any other line.

Vienna became a strong city in the sixteenth century, proof of which is the repelling of a force of 120,000 Turks who menaced the city and laid siege to it. The Turks were kept out of the city but their coffee and their mode of making it was not and as a result one can today secure the most delicious coffee in that city. Instead of having saloons they have what they term coffee houses. True in these places one may secure, wine, beer, cocoa and many other light drinks, but the vast majority of the patrons are to be seen at their coffee with a roll or piece of cake.

So far as I could learn there is no great amount of interchange of visits with friends in the city of Vienna. As one man expressed it, "why wear out the carpets with so much tramping of feet," and "why keep up a fire for the occasional visitor, it is much better," says he, "to meet one's friends in the cafe." So the cafe is a great meeting place, and women will go to one of such places and spend hours over a cup of tea or coffee. A cafe of any importance has its orchestra and the music one can hear in these places is of a very good order.

After having registered at one's hotel the first thing to do is to go over to the American Medical Association rooms and register for work. The American Medical Association was organized with a purpose of furnishing the greatest good to the greatest number capable of assimilating the "greatest good." All of the courses in the department of the eye, ear, nose and throat are given in English, but in many of the other departments it is rather hard to get some of the work in English, and these are given in German. It is a distinct advantage to be able to speak the German language, for one can thus get so much more out of the clinics. One who has spent six months in previous preparation has a good start with his German and then if he has time to take up the study of it with a private teacher, giving up one or two hours a day to it he soon has a working vocabulary. Then too you have it thrust at you from every side and your ear becomes attuned so that if you take a run into another country where a different language is spoken and then return suddenly to the German, it really seems like getting back home again.

The American Medical Association of Vienna was established as a result of action taken at the Thanksgiving Day banquet of the American physicians then resident in Vienna, Nov. 28th, 1903. Dr. Ravold, of St. Louis, in responding to a toast, dwelt at length on the need for such a society and made a motion, which was carried, that a committee of organization be appointed. This Committee called a meeting at the Hotel Hammerand for February 6th, 1904, and at this meeting, the Association was founded. Dr. Ravold was elected president and Dr. F. G. Harris of Chicago, secretary and treasurer. At its formation the association had but 35 members; at present it numbers over 2,500. The association maintains fine quarters at No. 28 Schloesselgasse, which location is very near the main entrance of the Allgemeine Krankenhaus and also near the Policlinic Hospital. The suite contains a reception room, a business office, a library, with several hundred books, and a lounging room with piano and other accessories. The Association subscribes for the best medical journals of the world, and these are to be had at all times. Though the Association is known as the American Medical Association of Vienna, yet its membership includes men from all quarters of the globe. They are there not alone from America, but from South America, Australia, our own island possessions, Japan, China, India, France, Norway, Sweden, England and in fact from all quarters. All are welcome, but the management is in the hands of the Americans. The constitution and by-laws of the organization do not specify that only Americans shall hold office, but that has been the rule. The Association is pretty much the ruler of the roost as regards the management of the clinical courses. Recently the association recommended to the University of Vienna that it not recognize certain schools of the United States and that a prescribed course should be taken to make a man eligible for a certificate from the University. The Dean of the university therefore has chosen some twenty-five medical colleges whom they will recognize in the future and a man must stay continuously in Vienna for a period of at least three months before he can get a "Zeugnis." In times past these certificates have been gotten for little if any work and the Association has done well to look into this matter of the granting of certificates.

The Vienna clinics are rich in material of all kinds and one will see the greatest variety of cases here. During the Congress of medical men held in the city during the month of October a great effort was made to furnish material for the visiting physicians. I visited Professor Finger's skin clinic and saw no less than three hundred interesting skin cases. All lined up with photographs "before and after" and some new ones that were rather obscure, and were up for diagnosis. They exhibited two cases of men with hair implanted into their scalps; 50,000 hairs had been so implanted in each scalp and they seemed to be doing well and of course were preferred to the ordinary toupe as made by the French tonsorial artist.

Owing to very favorable statutes the men in Vienna enjoy unrivalled advantages in the matter of post mortem examinations. So long as the hands and face are not injured in any way, a post mortem may be made on every cadaver and so they study pathology first hand. Living pathology as it has been termed. Then too it makes it very handy to get material for the various surgical operative courses. If a man is going to Vienna to specialize in certain work that he has but little training in before, it will be well for him to plan on a stay of from 8 to 18 months depending upon the nature of the work he wishes to take up. He must not go with the idea that living is cheap on the continent, for if he does he is bound to be disappointed. Living in Vienna is just as high as it is in New York and one will find it not so good in many ways. Of fleas and bedbugs there are a-plenty, to all of which I will testify. One cannot escape and there is no other way than to grin and bear it, scratching and itching the while.

Another institution that is at first very much missed by the foreigner (and now remember that the tables are turned and it is you yourself who is now the foreigner) is the continental breakfast. For brevity it again is the limit of endurance. A cup of coffee, a hard roll, some butter and marmalade is all you get. Of course if you wish to pay for it extra then you can have eggs, but that is about all. Bacon is a rather unheard of article of diet, at least it is not uppermost on the bills of fare as in our establishments. We used to walk miles to get to a place where they knew how to cook our old friends the ham and eggs in just the right manner. Of beverages there are a-plenty and they flow at all hours of the day or night. All sorts of places are given over to such things and in them the most delightful of music is to be heard. For instance, at the Volksgarten, a very central park just off the Ring Strasse, a large military band plays every Sunday afternoon and evening and also during the week.

Before leaving home I had heard of the work of a certain Professor Stancleanu of Bukarest, Roumania, and I was very much interested in the reports. I therefore persuaded a friend of mine, a Dr. Swan of Evanston, and his good wife to accompany me down to Roumania. Bukarest is about 1,000 miles southeast of Vienna and is a railway journey of some thirty hours on the fastest train, and by the way they do run fast. We were met at the station by the most modern of automobile busses and fine turn-outs with Arabian horses and drivers, who are Russian and dress in costume. This consists of a gorgeous velvet coat that reaches down to the top of a pair of heavy boots, a sash of bright ribbon is worn about the waist with two streamers running down on either side and a large Persian lamb cap topping off the whole. These drivers are all very sleek looking fellows and I inquired into their lives and found that they belonged to a sort of order. They marry and have one or two children and then submit to castration and penectomy and this accounted for their appearance. I never saw finer carriage horses than I saw while there and the way they drive up the street is a caution to behold. You would think they would run amuck before going very far, but they seem to be able to thread their way in and out in the crowded narrow streets without much difficulty.

They call Bukarest a second Paris and it does not belie the naming it has received. Paris sets the styles in all that they do. The dress of their soldiers is like that of France in many ways, their architecture is strongly influenced by the French schools, and the dear women depend upon Paris for the latest modes. Time was, and is yet, that the language for general communication is French. Recently, however, the English language has come into vogue and now families who have a governess see to it that she is English or at least can speak the language fluently. I was invited to a 5 o'clock tea and was surprised to find that all present could speak English very well. Also that they could converse equally well in French, Italian, German and their own language of Roumania. The American traveler is put to a great disadvantage by reason of the fact that he is unable to converse, in many instances, in any other tongue than his own. I can imagine how they feel, for we know how it is here with us. These people learn their languages at the right time and in the right way. They do not burn the midnight oil over some old German, French or Spanish book, but they get busy during childhood and get the conversational part of the language and then the study of it later. Naturally we can reason this out for ourselves as to why it is so. The very contiguousness of the various countries compels them in a way to master other than their own native tongue. If here at home the State of Iowa were France and if Indiana were Germany, how easy it would be for we Illinoisans, at least on the border lines, to speak the different tongues.

Now that the United States has secured possession of so many Spanish speaking peoples it behooves us in our preparation here in the United States for life's work to see to it that the youth has the proper facilities for the study of the Spanish language. Our trade with South America should be vastly more than it is and it is not altogether due to the scarcity of ships that we are not ahead of Germany in this particular, but rather to our persistency in sticking so close to our own language. The German merchant will write you in your own tongue, no difference if you are a Hottentot from darkest Africa, and so it behooves the American merchant and manufacturer to awake to the situation and see to it that our schools teach more of the living languages rather than too much of the dead ones.

Getting back to Bukarest again. At the Coltzea hospital we were very kindly received by Professor Stancleanu and his corps of assistants. We found the clinic fairly busy, but not running up to the limit of its capacity, owing to the fact that the country was suffering from an outbreak of cholera. At the end of the Balkan war the Roumanian Government thought it a good time to settle with the Bulgarians, and so while the Servians, Greeks and Bulgarians were having their little fiasco with one another, the Roumanians marshalled an army of 500,000 men in the short period of eight days and marched them over into Bulgarian territory and made their demands. It was an easy matter and the Bulgarians gave to Roumania considerable of their territory. Thus modern diplomacy again triumphed over active militarism, for the people of Roumania had been clamoring for war for some time, but the ministers held them in check until they thought the proper time had arrived. This coup d'etat has of course made things very lively in a business way and I think for the size of the city I saw more extensive building operations in Bukarest than in any other continental capital.

When the Roumanian soldiers returned from Bulgaria they were immediately sent to their homes and not sufficient time was given for the demobilization and as a consequence cholera was distributed by the soldiers into every province. Then began a fight that was worse than active warfare with a human enemy. Segregation camps were established and the sick were taken to these camps. The season of the year helped them in that the weather this autumn was most delightful. Nearly all of the doctors of Bukarest had been out fighting the scourge. My friend, Prof. Stancleanu, was a member of the Sanitary Council and while I was there he was very busy with the affairs of the organization. He himself had been out on the frontier aiding in the work. I also met an Indian doctor who had been serving with the Turkish army during the Balkan war, and now he and four other Indian physicians were in the service of the Roumanian army.

The one operation that I was very much interested in was that of the removal of the cataractous lens in its capsule as done by Prof. Stancleanu. The results are gratifying in the extreme and I was permitted to see the operation performed on several occasions. There is a great deal of trachoma in that section of the world: especially among the gypsy tribes, and of these there are some 100,000 in Roumania. One should not have the opinion that the entire country is made up of gypsies for it is not, but at the same time one can see them on every hand and their peculiar dress with its varied hues of bright colors gives a quaintness that is very enchanting. The music that one hears in the cafes is by these people and the tones they get out of their instruments and the characteristic music that they play makes the hour a very enjoyable one, and so we went on every opportunity to such places where an orchestra could be heard at the evening dinner hour. There is a minor note that permeates all their music, yet there will be moments of the brightest tone colors so that one does not get too far in the depths until a sudden outburst is made that again carries you aloft and away from utter despond.

On our way back to Vienna we stopped over for three days at Budapest. We were fortunate in having a letter of introduction from Prof. Stancleanu to his friend, Prof. Emile de Grósz, who has the chair of ophthalmology in the University of Budapest. The department of ophthalmology in the University of Budapest was instituted by Joseph Plenck in 1770. The growth was small so that in 1800 the department consisted of two rooms with six beds at its command, whereas it now possesses some ninety beds. The facilities for work are of the most modern in their appointment. Clinic and laboratories are quite ample. A library containing over 4,000 volumes with current periodicals upon ophthalmologic subjects is located in a very pleasant part of the building. A large amphitheatre holding 250 students is directly connected with the building, entrance being gained to it in the rear so that there is no disturbance of the patients. Ten hours a week is devoted to ophthalmology by the senior and junior classes, and a bright lot of students we found the morning we visited Prof. Grósz's clinic.

The East is wont to speak of the gone as the dim, distant past. So it is, in a measure, here in Hungary, and its capital city of Budapest. It surely looks back upon a past of extreme restlessness and the making of colossal changes. The location of Budapest has been held in times past by the Celt, the Roman, the Hun, Avar and Slav—finally passing into the hands of the Magyars and made the capital of their kingdom.

Years before the Christian era the Celts recognized the extreme importance of the location and its natural advantages and erected here a town which they called Ak-inh (Water Kingdom), and the Romans coming in the second century called it Aquineum. Here the Romans fortified themselves and prepared to resist the invasion of the peoples to the east of them. Finally Roman sovereignty gave way to the Hun, Goth and Lombard, but before doing so they here, as elsewhere, left monuments to their civilization. An aqueduct and the remains of an old Roman bath exist near the present city The beautiful Danube divides the city into two nearly equal portions. One on the left bank, Pest, meaning furnace, is of Slav origin as is that of the part on the right bank, Buda. The city is now all one and the union of the two gives u the present Budapest.

Like all cities, immigration has been the cause of the greater part of the growth. Twenty-five percent of the births in Budapest are of illegitimate parentage. This situation of affairs is to be deplored. One may well believe this statement for on every side are the evidences of this condition. Orphanages are flourishing and long columns of marching children may be seen on the streets every day in charge of sisters of various church orders.

The death rate has steadily declined from a high average of 42.2 per thousand in 1874 to 20.1 in 1907. There is much yet that can be done to improve matters. The decrease so far made is due in large measure to the perfection of the system of water supply for the city. Speaking of water supply reminds us that this is headquarters for many kinds and varieties of mineral waters, with their accompaniment of baths and hotels calculated to wrest the silver sheckels from those still able to reach the troubled waters. There are no less than twenty-five water cure sanitaria and Budapest is without doubt one of the greatest places for "water cures" and celebrated mineral waters to be found in the world. Most of the springs are hot ones and they are fed from a subterranean basin. It is said that Hungary, through her world renowned Hunyadi Janos and Apenta waters, is best known. Even the fame of her celebrated Tokay wine has to take second place to the peculiar advantages of her Adam's ale. In all from twelve to fifteen million bottles of Buda bitter waters are placed upon the market annually.

In Budapest, as in Bukarest, one can hear on every hand the wild strains of Hungarian music. In many of the cafes one orchestra does not seem to suffice, so that they have two organizations and the one relieves the other in the playing.

There are any number of public baths in the city of Budapest. One very large bath is situated in one of the beautiful parks of the city and the appointments are of the finest.

On Margaret Island is another large bath establishment. The city is now completing an immense public bath on the banks of the Danube, near to the old fort. As with us, there is an occasional steal in regard to the erection of public buildings, and so the construction was at a standstill on this building, while an investigation was being made regarding the excessive cost of the structure. When it is finished it will be a wonderful addition to the city.

In Berlin most of the time was spent at the nose and throat clinics of Prof. Killian, Jansen and Dr. Halle. Prof. Silex has a most wonderful private clinic with several assistants and student volunteers. His clinic averages over 10,000 new cases annually.

While in London I met Dr. Mehnarto, who was with Professor Koch on the expedition to Africa for the study of sleeping sickness, and I found him a very amiable gentleman. I found the doctor and his corps of assistants busy at the out clinic in the Margaret Street hospital, London. The cases of tuberculosis which they have are in those who are utterly unable to have the rest, fresh air, abundance of diet and the other requisites so necessary for the proper treatment of tuberculosis as we have been taught.

Contra-toxin is the name he has given to a group of normal serums adapted for the treatment of various diseases, both of bacterial and protozoal origin.

The idea of using reptilian serum in the treatment of disease is not altogether new to the medical profession, but Dr. Mehnarto claims that the combination of such a serum with the serum from other animals, as is found in the contra-toxin, is, he thinks, new.

Following the experiments of Flexner and Noguchi which are recorded in the Journal of Pathology and Bacteriology of May, 1903, he combined the serum from members of the two great groups of venemous snakes, *i. e.*, the colubridae, producing haemolysis, and the viperidæ, producing coagulation. He combines the serum from these two groups in such proportion that when injected into the human body they will produce neither haemolysis nor coagulation.

Dr. Mehnarto says that it is a well known fact that the injection of serum derived from the various warm-blooded animals, such as the sheep and the horse, has been used with slight success in the treatment of certain bacterial and protozoal diseases. The great dangers being serum disease and anaphylaxis.

It has been the endeavor of Dr. Mehnarto in the making of contra-toxin to combine the actions, bacteriolytic and antitoxic, of snake serum and serum from naturally immune animals in such a way as will make the resulting mixture harmless to the human being, if used in the proper dosage, so that neither coagulation, haemolysis, serum disease nor anaphylaxis will result, and at the same time the human body is not hindered in any way from making its own antibodies.

Clinical results have been obtained in the following diseases: Pernicious Anemia, Malaria, Trypanosomiasis, Tuberculosis and Leprosy, and the results obtained prove to them that the serum is possessed of a directly bactericidal action and is also a powerful stimulant of phagocytosis.

The Arneth polymorphonuclear nucleus ratio as an index of tubercular toxemia is used in the work of Dr. Mehnarto. Arneth gives the normal percentages in human leucocytes as:

Number of Nuclei	I	II	III	IV	V or more
	5	35	41	17	2%

In an appended table of one of the reports of Dr. A. White Robertson it is shown that the value of this count is great in estimating the progress of the patient. In cases not doing well the count is very high in the immature columns, and as the individual improves the count goes to the percentages as given above.

OPERATIVE TREATMENT OF DETACHMENT OF THE RETINA.

Elschnig states that he has punctured and injected 1 c.c. of the patient's own serum or salt solution in twenty cases: on both eyes in two of them. By aspirating out part of the fluid that has accumulated beneath the retina and, practically simultaneously through another cannula, injecting fluid in front of the retina to push it back into its normal place, approximately normal conditions can be restored. Seven of the eyes were much improved, but the condition was aggravated in ten. In one case a mycotic process developed, finally destroying both eyes. He has never had a complete cure, being less fortunate in this than Birch-Hirschfeld. But the method may arrest the trouble and save partial vision at least, when under less vigorous measures the eye is inevitably doomed.

A NEW OPERATION FOR DETACHED RETINA.

BY FLAVEL B. TIFFANY, M. D., KANSAS CITY, MO.

Heretofore there has been no treatment surgical, medical or mechanical which has made any real permanent cure of detached retina. The cases have baffled the efforts of the oculist. We have recognized the necessity of establishing a drainage of the fluid which has accumulated between the tunics. But the operations we have been making, while they establish a temporary drainage, do not give sufficient time for the retina to become firmly attached. And it has been our experience that the retina either breaks loose at the point of re-attachment or at some remote point.

The operation which I am now making seems to accomplish the desired results in the way of a permanent re-attachment. For I remove a portion of the choroid, thus establishing drainage for a sufficient period to allow the retina to become permanently re-attached. The operation consists in trephining the sclera in the central portion of the detachment. In the cases I have had up to the present date, the detachments have been in the superior and external quadrant near the equator. I use the ordinary small Elliott trephine such as is used in glaucoma. As soon as I have cut through the sclera and removed the button, the choroid present itself. I grasp the protruding knuckle and with the curved, flat scissors clip it away. A slight amount of the accumulated serous fluid with the vitreous escapes and the retina is forced into the opening of the choroid, coming into contact with both choroid and sclera. At this point it forms firm and permanent adhesion. In case it failed to adhere firmly at this point I think I should not hesitate to operate at another point or even to apply an electric cautery.*

REPORT OF CASE:

G. A. G., aged 40, married, carpenter of Kansas City, Mo., came to the office on the 13th of January, 1914. He said that about six weeks ago he was struck in the left eye by a lath. For the last week the sight of this eye has been failing. In getting the history of the patient I was somewhat surprised to find that he himself really diagnosed his case for he said he thought he had a detached retina though he had consulted no other oculist. He added that his brother had had a similar accident which resulted in detached retina.

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*One swallow does not make a summer and the success of one operation does not constitute a guarantee of the efficacy of the operation. But from the fact that all surgical treatment up to the present time has been practically a failure and that the case has been successful, the method would seem worthy of further trial.

The vision of the right eye was 6/7. The field of the left eye was very limited. When the hand was placed before the eye he could see just the tips of the fingers a little above and toward the temporal side, but could not count them.

The ophthalmoscope revealed detached retina at superior and external quadrant.

On January 15, 1914, I made the trephining operation as I have outlined. Immediately after the operation the patient said he could see all the fingers of my hand. The next day I visited the patient at his home and he was able to count fingers readily, to distinguish a ring on the finger and to see the hand as far as to the wrist. A week after the operation his vision in the left eye was 6/20 and he could see both to left and right, or had the normal field of vision.

REPORT OF CASE OF STEEL LODGING IN THE SCLERA.

BY EDWARD E. KRIDER, M. D., OELWEIN, IOWA.

The following case has been of special interest to me owing to the fact that foreign bodies, especially pieces of steel, seldom remain lodged in the sclera, as such substances either cause a double perforation of the globe, lodging in the orbit, or come to rest in the vitreous.

Mr. F. age 35, a Chicago Great Western employe, while driving railroad spikes was struck in the right eye with a spicula of flying steel which entered the globe about 4mm. from the corneal scleral margin at the equator. I saw the patient about an hour after the accident. There was a very slight inflammation of the conjunctiva where the steel had entered and vision was about 20/50. Tension slightly reduced.

Dr. Wassom immediately took X-ray pictures of the eye and located the steel apparently in the posterior wall of the globe, probably in the sclera. Moving pictures of the eye were also taken. One picture by having the patient look straight ahead for about 8 or 10 seconds, and then without changing the plate or position of the head, have him turn the eye to one side. This gave a faint double image of the foreign body, which showed that the steel was either in the posterior wall of the globe, or in the orbit just back of the globe, the attachment being so close that the steel moved with the eye movements. Another picture with the eye in constant rotation showed no foreign body visible.

The giant magnet was then applied to the point of entrance but with no response. I then opened the sclera between the external and inferior recti and again very freely applied the magnet, the patient complained only of a very slight pulling sensation in the back of the eye. In fact he was not very positive of even a slight pulling.

Failing to remove the steel with the magnet I closed the sclera, suturing the conjunctiva. Enucleation was advised and as this was refused the eye was treated symptomatically for about two weeks when the patient left me and consulted another oculist. At this time there was a marked ciliary injection, considerable pain, and a fair degree of vision—about 20/100. Tension normal.

I did not see the patient again until January 12, about three months after the accident. He had been under the treatment of an oculist who promised to save a sightless globe for him.

At this time he was barely able to perceive a very strong light focused into the pupil, there was a very slight ciliary inflammation and a marked minus tension. He also complained of severe pain in the eye radiating to the temple. As I refused to treat his eye any way medicinally he finally consented to enucleation. Before enucleating however more X-ray pictures were taken showing the steel in the same location as immediately after the accident.

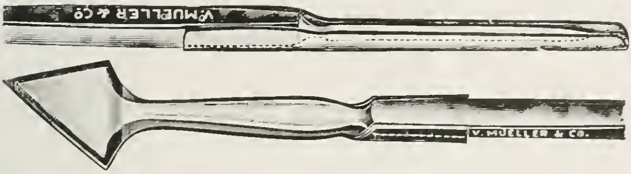
Drs. Wassom and Ward were present when the eye was opened—a sharp narrow spicula of steel about 2 mm. long was found lodged in the posterior portion of the globe, almost completely imbedded in the sclera. A small area of the sclera surrounding the foreign body presented a dark brown appearance. The interior of the eye had the usual appearance of a globe that had fallen a prey to atrophy following a ver severe plastic irido-cyclitis. The retina was completely detached.

This case greatly resembles two other cases reported in the Ophthalmic Record. One case reported by Dr. Frank Allport in the February number, 1912, and the other by myself in the December number. In both cases however the steel was found to have penetrated the posterior wall of the globe and lodged in the orbit, the attachment being so close that the foreign body moved with the eye-ball.

In this case the X-ray and moving pictures showed the same result as the two cases above referred to, but on dissecting the eye, instead of finding the steel lodged in the orbit it had remained in the posterior scleral wall.

SHIELD FOR GRAEFE CATARACT KNIFE AND ANGULAR KERATOME.

BY F. PARK LEWIS, F. A. C. S., BUFFALO, N. Y.



Shields for the protection of Graefe cataract knives and angular keratomes.

As all ophthalmologists know it is difficult to keep the edges and points in perfect condition on such delicate instruments as Graefe cataract knives and angular keratomes. In the process of sterilization the assistant or nurse is apt to allow them to strike the other instruments. The carrying of them in the case will sometimes permit them to slip forward, and in a multitude of ways their perfectness of finish is endangered. To protect them the writer has had shields made into which the instruments slip and in which they may be left when carried in the case and through the process of sterilization. These will also protect the instrument from contamination after being sterilized. The shields are very simple and light, being made of aluminum and scarcely appreciably add to the weight and bulk of the instrument. They have been made for the writer by V. Mueller & Co., to whom he is indebted for the cuts which are subjoined. These are presented in the hope that they may fill a need which up to the present time does not seem to have been met.

REPORTS OF SOCIETIES.

MEDICAL AND CHIRURGICAL FACULTY OF MARYLAND—SECTION ON OPHTHALMOLOGY.

Baltimore, November 19th, 1913. (Combined Meeting With Section on Laryngology.)

DR. C. A. CLAPP, PRESIDING.

The meeting, held at the Baltimore Eye and Throat Hospital, was of a purely clinical nature and was opened by Dr. E. H. Rowe, who presented three cases upon which he had done the trephine operation for chronic simple glaucoma. He dwelt at some length upon the various methods in vogue and described some of the cases he had recently witnessed at Fuch's Vienna Clinic. His personal method is rather unique in that he loosens the attachment of the conjunctiva at the limbus and reflects the flap upward instead of downward, with the apron-like effect, as do most operators. He follows Webster Fox's routine, from this point, using the Von Hippel trephine and selecting as his site the junction of sclera with discolored cornea. He does not perform iridectomy unless there is a prolapse of the iris. Despite his rather uniform results with the trephine operation he is undecided as to its superiority over the older methods.

DISCUSSION. Dr. E. A. Knorr quoted Stock's statistics on the 118 cases. The latter secured good results in 88 cases, while 30 were uninfluenced or became worse. Of those 30 cases 25 were nearly blind before operation. Of the 88 cases in which the tension remained low 35 showed improved vision, 31 retained the same vision and in 22 the vision was diminished. Of the latter 22 cases the diminished vision was caused by progress of cataract in 8, by hemorrhage into the vitreous in one, by iritis in 5. In the other 15 no cause was given. He quoted Axenfeld as securing good results in one half of his cases. There were 15 cases of late infections wherein the protruding conjunctiva became ulcerated. He stated that detachment of the choroid might be caused, following a stretching of the tissues, by the aqueous working its way behind that membrane from the anterior chamber.

Dr. Tarun asked whether the recent operators had performed iridectomy or not, and thought that any statistics on this subject should show in detail at what stage the trephining was done and what clinical and tonometric differences existed between its results and those obtained by regular iridectomy.

Dr. Knorr called attention to Elliot's statement that iridectomy is not an important factor in the operation.

Dr. R. L. Randolph said that, although he has not performed the operation, he cannot but feel that trephining is more in the nature of an exploit than a real surgical procedure. He considers that the elevated cicatrix is dangerous owing to the possibility of irritation, ulceration and subsequent infection. The cutting of the iris is, in his opinion, the most important feature, and he thinks that oriental statistics cannot be taken too seriously owing to the impracticability of watching the patients for any length of time afterwards. Finally, he asserts his belief that the trephine will follow the fate of the Smith cataract operation.

Dr. Rowe, in concluding, calls attention to the fact that the trephine operation is much simpler than iridectomy and much easier to perform, and closes with the apparently logical question: "If the same results can be gotten with it why not employ the simpler method?"

Dr. J. W. Downey exhibited a case of osteo-sarcoma of the superior maxilla and orbit, of one year duration. The patient, a colored boy, eleven years of age, was brought to the ear-clinic with the history of a running ear which was followed by the swelling of the face. The ear was found to be normal: the right side of the face was distorted by a large tumor mass of firm consistency. The right eye was markedly proptosed. X-ray photograph showed destruction of the superior maxilla and part of the bony orbital wall. There was no discoverable metastasis. The case had been referred to a general surgeon, Dr. Walter A. Wise, and declared inoperable.

Dr. Guerinot reported and showed photographs of a case of osteo-sarcoma of the left orbit in a colored man 48 years of age, a laborer by occupation, who entered the hospital on August 4, 1913, complaining of intense pain in left eye. Three years ago had fallen and struck left eye. On admission there was marked exophthalmos, purulent secretion, great conjunctival oedema and distention, and ulcerated cornea. Left temporal parietal and frontal showed marked osseous hypertrophy.

Patient very apathetic, showed great retardation of mental processes. Post-mortem refused by family.

Dr. H. V. Tweedie showed an extremely interesting case of embolism of the central artery of the retina in a woman, 58 years of age, who had experienced a sudden loss of vision, except for a small central portion, measuring 10° on the temporal side of the field. This small area could be distinctly seen with the ophthalmoscope, being almost normal in color, while the rest of the fundus was much lighter and presented a somewhat cloudy appearance of the retina. With plus .50 sph. the patient's vision was 20/15 over a small central area. This retained central vision he thought undoubtedly due to an independent blood supply by a small cilio-retinal artery from the circle of Zinn. The interesting feature of this case was a broken, segmented current of blood in the arteries upon the disc, which persisted for 72 hours after the primary observation.

Dr. Randolph recalled having seen a case very similar to Dr. Tweedie's, in which there was an intermittent blood current in the peripheral vessels of the fundus.

Dr. Harlan recollected a picture somewhat akin to this in which, with the direct method, there could be made out a rouleau arrangement of the blood column, divisions which were pushed along with each heart beat. This phenomenon was present in several branches of the vessels. The next day it had disappeared.

Dr. Tarun remarked that he had been interested in the study of cilio-retinal vessels foi a long time. In this connection he said that all accessory vessels were not cilio-retinal vessels. The true cilio-retinal vessels are distinguished by their hook-like shape as they emerge from the papilla. This shape can be easily accounted for by recalling the entrance of the short ciliary arteries into the posterior pole of the eye. They are some distance from the nerve and in order to get to the disc they must run in an oblique direction. After this oblique course they emerge from the disc, making a sharp bend again, in order to be distributed to the retina. Those small branches coming from the central retinal artery, before its entrance into the physiological pit, do not need to make this bend and therefore have no hook shape.

Dr. Whitham showed an ophthalmoscopic case in which there was a peculiar, ring-shaped congenital malformation of the retina in the region of the macula, and which caused no visual or perimetric disturbances.

Dr. Randolph considered the case a congenital one because vision and visual fields were unaffected. Dr. Harlan agreed with Dr. Randolph as to the congenital view.

The First a Case of Sclero-Keratitis and the Second One of Uveitis, Treated by Tuberculin.

Dr. C. A. Clapp presented the following cases:

The former a woman, 26 years of age, came for treatment on November 13, 1911, complaining that the left eye had been sore for one week. Upon examination there was seen a flamelike exudate in the upper outer quadrant of the cornea which did not stain with fluorescein. There was also some inflammation of the sclera in the same region. The infiltration extended until finally it reached a short distance beyond the center of the cornea with deposits on Descemet's membrane. Wassermann reaction was negative; von Pirquet test, positive. Physical examination by Dr. Freeman showed mucous rales at the apex of the right lung. The patient was taken into the hospital and 1/5000 milligram of T. R. given on November 29th, atropin, four grains to the ounce, being used in the eyes since the first visit. Following the injection there was no rise in temperature but slightly increased redness about the eye. The patient was now given increasing doses of T. R. until January 22nd, when 1/40 milligram gave both a slight local and general reaction, the temperature going to 99.5. At this time the opacity was much smaller and thinner. On January 31st 1/60 of a milligram of T. R. was given and increased up to 1/40 on the 16th of February, when the cornea was practically clear with no circumcorneal injection. During the treatment the patient increased in weight and felt very much better.

While he admits that this condition very frequently occurs and recovers without the use of tuberculin, he believes that, as the Wassermann reaction was negative, as there was an area in the lung which was suspicious, and as he obtained both a local and general reaction with the large doses of T. R., he is justified in making the diagnosis of Tubercular Sclero-Keratitis.

The second case, a white girl, age 12, came with the statement that she had had a blurring of sight in both eyes for two or three weeks. Her father and an aunt had died with tuberculosis. Dr. Brumback, upon physical examination, found some cloudiness at the apex of the left lung. The eye examination showed both corneae cloudy with mutton fat deposits on Descemet's membrane of each. The deposits were very large and distributed over the lower half of each cornea, more pronounced in the left. Wassermann reaction was negative; Von Pirquet, positive. Weight of patient at this time was 68 pounds. The patient was put upon tuberculin treatment, giving 1/1000 milligram of T. R. March 27, 1913, and increasing the doses at each treatment, giving two treatment a week. On April 18th, when 1/90 milligram of T. R. was given a note was made that the corneae were both clearer, with the deposits much thinner. No general or local reaction was seen until June 11th after 1/4 milligram of T. R. was given. The treatment was continued, however, until July 7th, when both corneae were practically clear and no reaction occurred after discontinuance of the atropin. The weight of the patient had increased under the treatment from 68 pounds to 80 pounds, and her general condition was much improved.

This is another case where he thinks he is justified in believing the process to be of a tubercular origin and in which the treatment with T. R. was most satisfactory. Whether these inflammatory reactions are due to the tubercle bacilli, to the toxin eliminated by the same, or to the general run-down condition, he is, of course, unable to say, but in these cases as well as in several others that he has treated in his private practice, he has been very much impressed with the use of tuberculin.

DISCUSSION. Dr. Tarun thinks that tuberculin finds its most useful field in eye diseases. He believes that we should use tuberculin in such cases provided the Wassermann is negative. He quoted the case of a young girl with a general uveitis whose vision was reduced to mere light perception. Following a negative Wassermann she was put on vigorous tuberculin treatment and began to improve steadily, her vision rising to 20/200. The case finally cleared up splendidly and the patient gained 34 pounds. He thinks the von Pirquet test useless in the diagnosis of tuberculosis and contends that the subcutaneous injections are far superior for that purpose. He agrees with most observers that tuberculin is not of much use in pulmonary lesions. Finally, he thinks that Phlyctenular Keratitis is often tubercular, that it reacts to the subcutaneous test in 100 per cent cases, and states that some writers assert that all cases should be treated as such.

Dr. Clapp believes that more of the so-called gastrointestinal conditions causing eye lesions are, in reality, tubercular.

Dr. A. D. McConachie showed an interesting case which had a profuse, annoying blennorrhoea of the lachrymal sac for years, and in which the canaliculus had been slit, the duct probed and, in fact, all methods of treatment tried. Finally, after a painless extirpation of the lachrymal sac, performed very satisfactorily under a local anesthetic, the patient had been entirely relieved of the foul blennorrhoea and the distressing epiphora as well.

Dr. Savage saw the above case and claims that a half ounce of pus came out of the sac.

Dr. Kemler remarked on the features of the case and said that he usually performs the operation under local anesthesia, as did Dr. McConachie.

Dr. Goldbach suggested that, at a subsequent meeting Dr. Harlan, appointed by the government to investigate the prevalence of trachoma among the Kentucky mountaineers, tell of his experiences there.

It was suggested by Dr. Cohen and Dr. Harlan that at the next meeting, the question as to the advisability of transferring the subject Otology from the Ophthalmological to the Laryngological section be brought up for discussion.

The meeting was then adjourned.

Lloyd B. Whitham, M. D.,
Secretary.

SECTION ON OPHTHALMOLOGY AND OTOLOGY MEDICAL AND CHIRURGICAL FACULTY OF MARYLAND—

(Special Meeting with the Baltimore Eye, Ear and Throat Hospital Staff and the Baltimore City Medical Society.)

Baltimore, December 4, 1913.

Clinical Meeting, 10:00 A. M.

Doctor Robert Henry Elliott, Lieut. Colonel in the Indian Medical Service, Superintendent of the Government Ophthalmic Hospital, Madras, and Professor of Ophthalmology in the

Medical College, Madras, India, was the guest of the Baltimore Eye, Ear and Throat Hospital, at which place he conducted an intensely interesting clinic, giving a most instructive exhibition of his surgical treatment for glaucoma and cataract.

To illustrate the former he operated upon six glaucomatous eyes, one of which had had a previous iridectomy performed. In all of these cases his technique was the same, his now classical trephine operation. To show the latter he removed a senile cataract, his method differing from that customarily observed in that he first introduced a knife-needle and split the anterior capsule, following this procedure by the corneal section which did not include a conjunctival flap. The entire operation, from a surgical standpoint, was beautifully performed.

At 8:30 P. M. of the same day, a special meeting, with the Baltimore City Medical Society, was held at the Medical and Chirurgical Faculty Building. Dr. Harry Friedenwald presided and introduced Doctor Elliott, who spoke on the "New Method of Treating Glaucoma."

Doctor Elliot began with the history of the operation when Argyll Robertson first began trephining, and traced it downward, through its trials by Fergus and others, to the present day. He said that von Graefe first foreshadowed a filtrating cicatrix fifty-four years ago, and believes that, if he had lived he would certainly have discovered it. His idea, he said, was to enlarge the channels of excretion and provide a passage from the interior of the eye into the subconjunctival space. It was advisable to endeavor to make a *sclerostomy*, thus allowing the fluids to escape from the interior of the eye and filter through the lymphatics of the subconjunctival space. Professor Lagrange first hit upon this when he thought of cutting a bit of the sclera out, and he asserts that everything done since then is but an elaboration of this method, brought out some ten years ago. But he contends that the Lagrange operation lacks safety as does the old iridectomy. To explain the success of the latter operation he says that it establishes a filtering cicatrix, and that otherwise, it is a failure. In a successful iridectomy he has never failed, on pressing over the scar with a spud, to show a boggy, pitting, filtering cicatrix. He thinks that the splendid results in acute glaucoma often secured with the old iridectomy were due to the fact that it provided a temporary filtration and tided the patient over that attack, while, attention having been directed to his glauconatous predisposition, medical supervision, regulation of the bowels and diet, withdrawal from care and worry, and so forth, prevented another attack. He maintains that, if one is going to do good for glaucoma, one must establish a filtering cicatrix.

Among the methods tried by others is to include a piece of iris in the scar. This is most dangerous and it is extremely illogical to think that the incarcerated iris produces this filtration. It occurs *in spite of it*. To illustrate:

Given a case of iridectomy for glauconna, with the pillars incarcerated. Open after 24 hours the iris can easily be replaced. Try to free it after four or five days and one will find that this is the only part which you cannot open. The exudation from the iris seals it down.

As far as the technique is concerned he deems it best to go far forward and thus get away from the ciliary body. This point, he thinks, has not been appreciated before. The cause of failure, in this operation, is the impaction of uveal tissue in the wound. On examination of trephine failures one can always find evidences of uveal tissue included in the wound. For absolute success one must have a *foreign body free fistula*. He emphasizes this as a cardinal principal. He was lead by this conviction to push his wound further and further forward. He used to dissect up to the limbus and sometimes noticed that it would split beyond this point. Finally, he observed that when he stripped so far forward he had less and less trouble with uveal tissue. Thus it dawned upon him that if one would split the cornea far forward one would obtain better results. Therefore he splits up, not only the corneal epithelium and Bowman's membrane, but the superficial lamellae of the cornea as well. He does this with a dull instrument and considers it essential not to *cut* but to keep in the natural lymphatic spaces between the lamellae of the cornea, and thus insure a steady lymphatic drainage.

A corneo-scleral wound constantly bathed by this liquid will remain patent—there is no tendency to heal. The filtering area truncates the cornea. He lays particular stress on the cornea because of the fact that the angle of the anterior chamber may be closed up and the iris drawn forward even as much as .75mm. Then there will still be 1.5mm. available in the cornea for trephine.

Priestly Smith contends that a 2mm. hole is too big. The speaker, however, thinks that a 2 mm. trephine should be used in order that the ciliary complications may be effectually dealt with. His method is to seize the iris and disc in one grasp and cut them off together.

He *first* cuts through the *corneal* edge so that the iris bulges out there and throws up the disc "like a little trap-door with the hinge backward." Now there is no reason why two-thirds or even one-half of the disc may not be left. Then one will still have a full millimeter between the angle and ciliary body—i. e. the "dangerous zone."

Of course the danger at this point is that the patient may move and the iris thus be pulled through the opening, for it is extremely difficult to put the iris back where it belongs through a small, circular hole. Hence the advantage of grasping the *disc* also, as it gives a fixation and this cannot happen. Trouble is also prevented, in his method by the fact that the iris is cut off first—being the most anterior structure.

He routinely uses a normal saline irrigation in order to wash the iris back. He has irrigated in this manner 7,000 cataract cases, 1,000 trephines, and thousands of iridectomies and has never had a complication that he could blame on irrigation. He is convinced that it is not half enough used in these cases, and considers it much preferable to a blunt instrument for replacing the iris. Careful and complete reposition is important and he is sure that experimentation on dogs eyes would show a foreign-body-free cicatrix in all successful trephines.

In speaking on incisions he quotes Treacher Collins who says that this method is best for producing an ideal cicatrix, for the following reasons:

1. External wound furthest from wound in interior of eye.

2. Epithelium is as far from wound as possible, which is of great advantage because of the fact that a certain number of these openings are closed up by a downgrowth of the epithelial cells into the wound. Thus if the wound in epithelium were not remote from trephine opening it might readily be closed up. He cites, as illustration, one case in which stratified corneal epithelium lined the endothelium of the cornea.

The suggestion has been made, by Fox and others, to use a flap reflected from below up. This would give an external wound near the internal wound. In these cases the adhesion of the flap takes place around the limbus. In a congested flap the plug of fibrous, or connective tissue, may creep down into the trephine hole. Therefore he thinks it best to avoid this by placing the flap incision far away, dissecting downwards. He has never found a case in which he could not split the cornea.

Discussing results he mentions the fact that his most ancient results are four and a half years old, and that people consider the method still on trial. But successful fistulous cicatrices are very old, Fox, Lagrange and others having had some under observation, and why should it not be the same with the trephine, from analogy?

He cannot recall an instance in which vision fell after trephining, unless from intraocular hemorrhage. On the other hand he usually secures a wonderful improvement in vision. Before operating he prognosticates as follows: if the patient has lost all vision for six months it is hopeless, but within six months he is sanguine.

He refers to the extremely low tension, spoken of by some, after trephining, and thinks that it is due to the fact that the whole disc was taken away. However he does not consider it a terrible calamity, for he has cases with very low tension who are doing splendid work with their eyes.

Some cases will have their tension relieved by operation but will still go on to blindness—these are the optic nerve atrophy cases.

The trephine has other fields of usefulness, besides that of glaucoma. The Germans consider it the most satisfactory of all methods in the treatment of buphthalmos. He has witnessed splendid results from its use for staphyloma. In conic cornea it is employed to reduce the intraocular tension preparatory to subsequent surgical procedures. Parker has trephined over detachment of the retina and cured the same.

In closing he expresses his firm belief in the ultimate acceptance of the operation and advocates it for acute and subacute glaucoma, but especially for chronic glaucoma.

Dr. Friedenwald then called upon Dr. L. Webster Fox of Philadelphia, who was present. Dr. Fox discoursed briefly him and was received with joy because he like many others, realized the woeful failure of iridectomy as a standard procedure in glaucoma. He immediately went to England to investigate. He saw his first two operations in Liverpool and was convinced that it was the best operation of the time. He returned to Philadelphia and commenced performing that operation but did not go far enough in splitting the cornea. He used the sliding flap and found that it would unite at the margin and heal up. He found also that he obtained the filtering. He did not meet with the difficulties outlined by Treacher Collins and Elliott. He then used the von Hippel trephine and in such a manner that it only went 1mm. through the cornea. Since seeing Elliott's results he feels that his operation is the one to be commended and intends, from now on, to perform it, paralleling it with the old ones, and trying, whenever possible to verify the epithelial downgrowth microscopically.

DISCUSSION: Dr. R. L. Randolph asked the speaker of the evening whether or not he had ever observed any subsequent irritation at the site of these blebs, whether he had been satisfied that filtration was going on in old scars that were not much elevated, whether he had ever seen any infection from the local irritation, whether he had observed any blindness following glaucoma simplex after three years, and what anesthetic he employs. Personally he expressed his entire satsifaction with iridectomy for acute glaucoma, although not in chronic glaucoma.

Dr. Elliott replied that he has seen very troublesome irritation around the bleb,—i. e. some redness. He thinks that these are cases which occur after the small flap and not after large flaps are made, when the elevation, naturally, is less. With regard to late infection: In certain cases the chamber does not heal up, due to a permanent fistula at the margin of the flap. This might admit infections, but can be cured in 24 hours by local applications with nitrate of silver. He does not like a general, anesthetic because it deprives him of the assistance of the patient. The local anesthetic is usually perfect, the patient suffering nothing like the pain of the old iridectomy. He injects adrenalin and cocaine under the conjunctiva, and must then put in stitches afterward. His conparative results of trephine and iridectomy: With the former, results are fine, patients doing splendid work: with the latter, not so.

Dr. H. Friedenwald asked Dr. Elliott for a resumé of his after treatment. Dr. Elliott said that if there is fluid in the anterior chamber all is going well. If after 24 hours tension is subnormal, if filtration is going on under the flap, he uncovers the other eye. If so after 48 hours he instills atropin and allows the patient to sit about the room, tieing up the eye at night. After 48 hours if the eye is soft and filtration going on, one can *push atropin.*

Dr. S. Theobald asked for the indications in stitching the conjunctival flap. Dr. Elliott said that he only does this in restless, worrying cases, and seldom had to resort to it in the Indian patient. If, however, it should be necessary to trephine to one side of the mid-line of the eye, sutures are required.

Dr. Hiram Woods asked if Dr. Elliott had observed much striped keratitis following his operation. Dr. Elliott replied that he had never seen it after trephining although he had witnessed it following cataract extraction.

A rising vote of thanks was given for the speaker, after which the meeting was adjourned.

Lloyd B. Whitham, M. D.,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

The regular meeting of the Chicago Ophthalmological Society took place in the East Room, Hotel La Salle, Monday, Dec. 15, 1913, the President, Dr. Willis O. Nance in the Chair.

Dr. C. G. Darling presented two cases of Interstitial Keratitis.

The patient a man of 43 years of age, when first seen by Dr. Reeder at the Rush dispensary, complained of lachrymation of the left eye.

On examination a very faint haze was to be seen in the lower temporal quadrant of the cornea. No vessels, other media clear, fundus normal.

When seen three days later, eye more sensitive, ciliary injection present, interstitial haze more marked and extending toward the center of the cornea. A history of an initial lesion three years ago was obtained, the patient saying he had a slight alopecia and sores in the mouth.

Wassermann made by Dr. McClellan was strongly positive.

Today, ten days after seeing the patient a nodule has appeared in the iris. The age of the patient, nodule in the iris and no sign of hereditary syphilis make it very probable that this is a case of interstitial keratitis in acquired syphilis.

The other patient also seen at the Rush Medical Eye Clinic is a man 29 years old, who denies venereal disease, has two children living and well; his wife has had no miscarriages. He has a much more marked keratitis than the other patient, the whole cornea being hazy; new vessels growing in from limbus marked ciliary injection. The case has now been of one month's duration. No signs of hereditary syphilis and no family history of same. Wassermann made by Dr. McClellan strongly positive.

Taking the history, age of patient into consideration, one might believe this to be also a case of keratitis in acquired syphilis, although of course it may be a case of late interstitial in inherited syphilis.

Dr. A. C. Croftan: Read a paper on Gouty Iritis: Typical gout in this country is exceedingly rare, but is becoming more frequent as we become more rich and have more leisure. In England we can go into Bartholomew's or Charing Cross Hospitals and see cases at all times, but gouty lesions of the eye are exceedingly rare, possibly because they are not usually recognized. On inquiring of my ophthalmologic friends I find that the diagnosis of gouty iritis is considered exceedingly difficult if not impossible. In the three cases I have had the diagnosis was very much in doubt and seemed to lie between rheumatic iritis, whatever that may be, syphilitic iritis, and in one of my most virulent cases there was a difference of opinion as to whether it was rheumatic or tuberculous. One had a prolonged course of tuberculin and the other of the salicylates, with no particular effect. Finally the metabolism was worked out and it proved to be gouty in the broader sense and was treated accordingly.

Dr. Croftan then explained the sort of patients in whom a gouty condition might be suspected, describing the cases of frank gout, with arthritic symptoms, tophi in the ears, etc., and those in whom the symptoms were more vague, who were perhaps regarded as neurasthenic, who had gastro-intestinal disorders, possibly migraine, or asthmatic attacks. In such cases, if a violent iritis developed there was nothing particular to point to gout unless they were studied more from a chemical than a clinical point of view. Though unrecognized he did not believe they were as rare as was thought.

Croftan then explained the manner of estimating the endogenous and the exogenous uric acid excretion in the urine on a general diet and on a purin-free diet, the uric acid being the causative factor in the production of gout. A patient kept on a purin-free diet, by which is meant one free from substances which produce by their breaking down, uric acid and its congeners, for four or five days, would still be excreting (in a normal person) a certain amount of the uric acid bodies, which was termed the endogenous uric acid. If then placed on a diet containing the purin bodies the increased amount of uric acid excretion would be a measure of the exogenous excretion, and an index of the patient's condition with reference to uric acid excretion. By a purin-free diet he meant one practically free from the purin bodies, which break down into uric acid or its congeners. A purin-free diet might include the products of female animals such as eggs, milk, fish eggs, etc.

Dr. Croftan expected to demonstrate a patient who had been brought before the society a year ago, who had a most violent iritis which resulted in the loss of one eye, in spite of the most energetic anti-rheumatic and tuberculin treatment. A year later he came back with the same condition in the other eye, and a study of his metabolism was made, with the result that he was put on a purin-free diet for two or three days, given enormous doses of atophan, which liberates uric acid from its adhesions in the body, and within forty-eight hours the eye cleared up and has stayed clear, while during the previous year he had had a number of recurrences.

The two other cases presented some interesting features. One was a woman, a patient of Dr. Casey Wood, who was in doubt about the etiology, and an equally good man differed with him as to whether it was tuberculous or rheumatic. She recovered on the anti-gouty treatment and remained well. The three cases seem to bear out the contention that these forms of iritis are gouty.

It may seem far-fetched to recall the similarity between real gout and the so-called lead gout, but in cases of lead poisoning the whole syndrome of gout is presented so completely that it cannot be distinguished except by chemical methods. This was the case in a tin worker who had arthritis, migraine, asthma, eczema and iritis. His purin metabolism was worked out, he was treated and the result has been very good.

The results in the three cases were such as to warrant the diagnosis of gouty iritis. In the treatment the diet should be as nearly purin-free as possible, which does not mean a vegetable diet, as was formerly thought, nor one entirely free of meat, but if it is desired to be accurate, eliminate beef and give the products of female animals as described and then give anything else in the calendar, except that alcohol is to be avoided of course. Then cause the most rapid possible elimination, which does not mean the giving of the lithia salts, but perhaps some alkalies, and give atophan. It is not a uric acid solvent. There is no such thing, but it liberates it from its connections in the body, and will greatly increase the uric acid output for a few days even in a normal person.

Dr. Croftan wished to hear the experience of the members with cases of iritis which seemed to be gouty, and whether they could describe any features which would distinguish these cases from the tuberculous and the rheumatic cases or the syphilitic cases.

Dr. H. W. Woodruff, Joliet, reported the case of a patient in his care who had twelve attacks of iritis during fourteen years, which he thought might be due to the cause Dr. Croftan spoke of. This man had good care, had been thoroughly examined, had been in the hospital for considerable periods and had been pronounced otherwise physically sound, with the syphilis and tuberculin reactions negative. The attacks came on at certain definite times in the spring and fall. Some of the latter attacks had been exceedingly severe so that the anterior chamber would become entirely filled with bloody exudate. He had strenuous local treatment and eliminative treatment and had always made a thorough recovery until the last time, when the inflammation extended to the ciliary body, so that he had a cyclitis which left some exudate in the vitreous. The question of uric acid was not taken up in his examinations, but gout was eliminated in the history. He has a rather indefinite rheumatic history. Dr. Woodruff asked that Dr. Croftan in closing say something about the significance of indican in the urine.

Dr. W. H. Peck asked Dr. Croftan what form of alkalies he used. Dr. J. C. Swan asked whether he considered eliminative treatment of any value in these cases.

Dr. M. Z. Albro, Chicago, reported the case of a man of 45 who had previously been active out of doors, but in later years was confined to office work, who came to him with a severe iritis, which was remarkable because of its severity without hemorrhage or exudate such as Dr. Woodruff had spoken of. He had no history of rheumatism and the Wassermann was negative. He felt that there wasn't anything left but rheumatism and gout and he gave him effervescent lithia tablets, with nothing else, except the ordinary local treatment and the iritis cleared up.

Dr. W. A. Mann, Chicago, had seen a number of rheumatic cases, but so far as he knew no gouty cases. During the last two or three years in addition to local treatment he had used vaccines with the idea that there might be infection. It was conceivable that the uric acid produced lessened resistance with increased liability to infection. Stephen Mayou of London had examined the aqueous in a number of these cases and had recovered a few colonies of staphylococci in what he calls rheumatic iritis.

Dr. W. O. Nance said he had reported a case eight or ten years ago to the society in a man of 25 who had had seven attacks of iritis. There was no syphilitic or rheumatic history. They were never able to find out the etiology and it is possible it was due to the condition which Dr. Croftan had described.

Dr. Carroll B. Welton, Peoria, asked what had been the result of the Wassermann test in Dr. Croftan's cases.

Dr. Alfred C. Croftan in closing said he was a little disappointed in not having his questions answered in regard to the clinical differential diagnosis between rheumatic, syphilitic and tuberculous iritis.

While he said that he gave alkalies, answering Dr. Peck, he did not think they did any particular good. Bicarbonate of soda was as good as any, but it was fashionable to give the alkaline waters. They probably exercise a good effect on the intestinal digestion. These cases are very commonly associated with hyperacidity, with a relatively low alkalinity in the intestinal digestion and rendering the flow of bile more difficult, with toxemia from that cause. Eliminate of course, and he is in the habit of using large colonic flushings, with sodium bicarbonate, perhaps. They help to keep the bowel clean and the solutions act as a mechanical distending factor on the region from which the bile comes, and there again absorption of a certain amount of alkali aids. He has no faith in lithia and has never seen the slightest result from it. He thought the profession had gone crazy on vaccines, thought they were worth trying. He wouldn't assume to answer the question, but if there were some infection then undoubtedly the therapy would be valuable in increasing the resistance. He thought the point well taken. The Wassermann test had always been made, but he was not as happy about the Wassermann test as formerly, and especially about a negative. Indican was important to study, and the whole group of aromatic sulphates which are the urinary evidences of putrefactive disassimilation of proteids.

Dr. Albyn Lincoln Adams, Jacksonville, in his paper on "The Illinois School for the Blind and its Statistics of Blindness," gave a history of efforts to establish schools for the education of the blind in the United States, and described the Illinois Institution and its origin through the efforts of Samuel Bacon, who was blind himself, and through whose influence in the legislature the institution was started. He was for a short time its principal. Dr. Adams then described the course of instruction of the blind as it has been developed, together with the methods of printing and writing and the various industrial activities carried on in the education of the blind to become self supporting. These industries and the institution at Jacksonville were illustrated by lantern pictures, and tables were shown of the number of blind taught in the institution since its founding, the percentages of blindness of different degrees in the inmates and a classification of causes, following the scheme of Magnus. It was shown that 17 per cent were due to ophthalmia neonatorum, 15 per cent to traumatism, 12 per cent to general diseases and the remainder to other general causes which he classified as idiopathic. He found that there was about 35 per cent of preventable blindness in the school, in which he considered ophthalmia neonatorum and traumatism, chiefly in industrial pursuits, as among the chief causes.

In answer to questions Dr. Adams said that in the last 149 pupils 25 were blind from ophthalmia neonatorum, and the reason the percentage was smaller than the average was because there were among them a large number of men who became blind from other causes. He did not know how the number compared with New York, but in Massachusetts they are accomplishing a great deal in the reduction of the number of cases. He thought a large proportion of the blindness could be prevented by having proper legislation and enforcing it. He was inclined to think a large number of physicians paid no attention to present laws. He made inquiry among the physicians in Jacksonville and found that a little less than half used prophylactic measures.

Dr. Nance in answer to a question said an ordinance was passed in Chicago requiring the reporting of ophthalmia neonatorum, but one year only 30 cases were reported. The present health commissioner with a larger appropriation expects to bring about a better enforcement of the ordinance. Dr. Tivnen made a suggestion that committee be appointed by the society to attempt to bring about better conditions in this regard, and then agreed to present it in the form of a motion later. Dr. Nance said that although many of these cases were blamed on the midwives, yet he had seen a statement to the effect that the physician is to blame in many cases. Dr. Tivnen said that many hospitals would not take these cases unless they paid for a private room and had a special nurse, but that the Chicago Eye and Ear Infirmary and the Cook County Hospital were the only places that would take them without payment. Dr. Geo. F. Suker said that Cook County had a separate hospital to take care of such cases without expense to the patients, and with specially trained nurses. He thought it ought to be made compulsory to take patients there, whether charity patients or not. He thought it extremely reprehensible that any of these cases should occur, as they did, among a certain class of practitioners, and that there was no excuse for having one of these cases so badly treated as to permit of vision below the economic requirements. It could be cured. Dr. Adams thought some of the expense of caring for the blind in institutions might be better spent in preventing this blindness. Dr. Nance said there was ample provision in the Eye and Ear Infirmary to take care of all cases in Chicago.

Dr. M. Z. Albro, Chicago, and Dr. C. F. Burkholder, Chicago, agreed that their papers should be deferred, and Dr. C. F. Burkhardt, Effingham, read his paper on "Ophthalmia Neonatorum, with Report of a Typical Case," and the discussion of this and Dr. Adams, papers were continued.

Dr. C. F. Burkhardt in his paper after stating that the medium of contagion in ophthalmia neonatorum, the discharge from the vagina of the mother, was pointed out by Piringer in 1839, and that its true etiology was only known after the discovery of Neisser and the demonstration of the role of contact by F. Jaeger, gave a brief account of the characteristics of the disease and outlined his method of treatment, which consisted in placing the patient in a hospital, if possible, under a competent oculist and nurse, the application of cold to the eye, cleansing it with boric acid or other solutions at frequent intervals, and the instillation of argyrol, which he had found better than other silver salts. Nitrate of silver in 2 per cent solution might be used on the everted lids once a day. This was the plan of treatment followed in his case, which he first saw on the eleventh day after birth. Perfect recovery resulted. He dwelt on the importance of prophylaxis by the Crede method and on the responsibility of the profession in this regard. The cardinal point in the treatment he regarded as the frequent and thorough cleansing of the eye of all pus, thereby lessening the danger of corneal ulcer.

Dr. George F. Suker in the discussion emphasized the importance of the proper technic of the Crede prophylaxis and said it consisted in the installation of a 2 per cent silver nitrate solution into the inner canthus of each eye while the head is passing over the perineum and not after the child has been born. Dr. Richard J. Tivnen said the point emphasized by Dr. Burkhardt of frequent and thorough cleansing was the crux of the whole matter. In carrying this out a frequent mistake was in having the douche-bag too high which endangered the cornea. He recalled one case in which the cornea was abraded in this manner. He felt that the nurses should be given special instruction in this matter, and in matters of eye nursing generally, which at present was neglected. He said that cultures should be made of every discharge in order to be on the safe side. He protested against the loose manner in which the Crede method was described in the text books, which allowed the inference that the instillations of the 2 per cent silver solution might be repeated.

whereas subsequent use of the solution should be on the everted lids and it should not come in contact with the cornea.

Dr. W. H. Peck said that practically all the blindness that occurs among nurses has come from their treating ophthalmia neonatorum, and gonorrheal ophthalmia in the adult and in his lectures to the nurses at the hospital he lays great stress on exercising care not to contract the disease. He favored nitrate of silver in treatment, also argyrol in some cases, but in stronger solutions than those usually used. He also makes applications of iced pledgets of gauze, which limit swelling. One difficulty with physicians is in everting the lids. Any excess of solution applied to the lids could be neutralized by saline. A good suggestion which he favored was the making of prophylaxis obligatory and requiring the physician and midwife to certify on the birth certificate that they had used the prophylactic treatment, and a penalty for failure should be attached. This would have a wonderful educational value and in a few years they will attend to it as a matter of course. Thorough instructions as to prophylaxis should be printed on the back of the birth certificate.

Dr. Clark W. Hawley said that in five years' service in the Cook County Hospital he had not lost a single eye from corneal ulcer, although his colleagues lost a number, and the treatment he used was 60 to 70 grains to the ounce of nitrate of silver solution. As to the danger of getting the solution on the cornea, that had been his method of treating corneal ulcer. It was safe if properly used, and in 25 years in his hands it had not resulted otherwise than favorably. Dr. W. A. Mann mentioned the application of sterile vaseline to the lids to prevent gluing of the lids. Silver nitrate had been his sheet anchor in 5 per cent. solution, particularly in the late stages. Argyrol had also been used in 50 per cent. He knew of the loss of one eye by dropping in a 5 per cent solution of silver nitrate. This is entirely different from using the strong solution on an ulcer, which is a different tissue from the normal.

Dr. W. O. Nance said the three essentials in the treatment were copious irrigations, the use of silver nitrate and the maintenance of the physical condition of the patient. It had not been his experience to lose an eye. He had seen them go from bad to worse under the best of care and treatment even when seen early. The cornea is the poorest nourished tissue in the body, and in weaklings it disintegrates in spite of all measures, and the man who says all cases can be cured does not know what he is talking about, he has not had the experience. A canthotomy is a helpful procedure. What irrigating fluid is used is a matter of no great consequence, the idea is to cleanse the eye. I agree with Dr. Hawley on the use of strong solutions of silver. The method of Bettmann of Chicago 20 years ago was to use a 5 per cent solution the first day, a 10 per cent on the second day and if necessary in 24 or 48 hours a 15 per cent solution. He had followed that for years and had never seen any harm from it.

Dr. C. H. Francis called attention to a lid retractor which was useful in the irrigation of these cases. Dr. J. C. Swan mentioned the importance of reduction in the strength of the solutions and the danger of overtreatment as the patients got better, the presence of the microorganism being watched in smear preparations. Dr. Oliver Tydings protested against the use of the strong silver solutions and felt that they could not be otherwise than dangerous, from the fact that it was at variance with his experience and that it was at variance with the pathology of suppuration and they were surely capable of destroying an eye. They would denude the eye of normal epithelium and in the course of a few days it will be found that the gonococci though present are not producing the same amount of trouble. Canthotomy is all right and so is heat. Dr. W. A. Hager had had three cases of gonorrheal ophthalmia in adults in the hospital at the same time under competent nurses. In one he used strong silver nitrate, in another protargol, argyrol in another and nothing in another, and the results were the same in all 5 per cent mortality. In children it is a matter of drainage. If the lids are swollen split the canthus, irrigate with any solution and keep the lids smeared with a little vaseline, and I have one scar on one cornea.

Dr. M. Z. Albro thought an important thing was to open the eye at frequent intervals. Considered embryologically the cornea was a part of the integument. Its nutrition is poor and should be supported by bringing it in contact with the element which it was intended to meet. He believed that exposure of the cornea to the air at least every hour during the day perhaps had more to do with success in maintaining the cornea than anything else, enabling it to renew its nutrition.

Dr. C. F. Burkhardt in closing again emphasized the importance of thorough cleansing of the eye, and admitted that perhaps he did not use strong enough solutions of the silver nitrate. He thought the agitation of the question of prophylaxis should be kept up. Physicians should be compelled to report the fact that they had used proper prophylaxis, and its neglect should be a finable offense.

Dr. Richard J. Tivnen then moved that the chair appoint a committee of three with power to act from any and every angle that seems desirable to promote practical measures for preventing the spread of ophthalmia neonatorum in the city and state.

The motion was seconded and carried.

The Chair appointed Dr. Richard J. Tivnen of Chicago, chairman, Dr. Albyn Lincoln Adams of Jacksonville, and Dr. C. F. Burkhart of Effingham on the above committee.

Wesley Hamilton Peck, Secretary.

CATARACT EXTRACTION WITH CONJUNCTIVAL BRIDGE.*

If Dr. Robert Scott Lamb will refer to Page 57 in "The Practical Details of Cataract Extraction" by H. Herbert, F. R. C. S., Major I. M. S. published by William Wood & Company, New York, 1903, he will find the following description of subconjunctival extraction performed under a conjunctival bridge.

"Subconjunctival Extraction (Vacher, Pansier)—extraction performed under a conjunctival bridge, or flap left uncut at its extremity—appears to provide exceptional security against prolapse of the iris in simple extraction. Vacher records 120 extractions free from prolapse. But this is the only advantage not obtainable quite so certainly by other means. Haemorrhage into the anterior chamber from under the flap is said to be controlled by previous instillation of solution of suprarenal extract. But even so, the difficulty in completely evacuating the lens-substance must at times be great. Vacher had one panophthalmitis in the above series."

L. Webster Fox, M. D.

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*"Cataract Extraction with Conjunctival Bridge." By Robert Scott Lamb, M. D., Washington, D. C., Published in The Ophthalmic Record, November, 1913.

November 5th, 1913.

Dear Sir:

Will you allow me to make a brief reply to Dr. Samuel Horton Brown's article on "The care of school children at Moorfields" which appeared in the October issue of the "Ophthalmic Record."

His article is most appreciative, with the exception of his remarks about the spectacles supplied to the patients by the hospital's optician. About half of the lenses are made in England, some in Germany and some in France; none are bought from the American Optical Company. The frames are English, and are made in Wolverhampton.

The optician supplies the spectacles according to the pattern adopted by the committee. Gold-filled frames, or nickel frames are quite unsuitable for children, as the metal is soft and pliable. Steel frames are selected purposely because such frames remain rigid and keep their shape. No obstacle is placed in the way of a patient who wishes to pay for a more expensive style of frame. But the majority of the patients are very poor, and they gladly avail themselves of the hospital pattern which is sold at as low a price as possible.

Each patient is measured for his glasses so as to ensure correct centering. Moreover the centering is kept correct by the rigid steel frames. The cheaper grades of gold frames are useless, except in the hands of careful and gentle patients, as they can be bent and twisted out of shape so easily.

I am,

Yours faithfully

Robert J. Bland,

Secretary.

Royal London Ophthalmic Hospital
(Moorfields Eye Hospital),
City Road, London, E. C.

The American Society for Physicians' Study Travels announces an attractive tour during the last week in June and the first week in July, including the larger cities of Canada and the eastern states together with the principal pleasure resorts in these sections. Dr. L. Webster Fox, Philadelphia, is chairman of the finance committee.

Editor Ophthalmic Record:

I was very much interested in Dr. Ellett's chart for the tonometer, as I very soon discovered the necessity for the same. Mine is for the Schiötz instrument. I have also found it convenient to include Dr. Marple's table of relation of mm. of mercury to palpation. This card, like Dr. Ellett's, fits in the cover of the instrument case. I also have another hanging on my desk.

David W. Wells.

Tn =15—25mmHg=3—6 W5.5
T+ =25—40 " "
T+1=40—60 " "
T+2=60—90 " "
T+3=90+
Deflection most reliable 2-4, never more than 5.

Wt 5.5gm 1mm=35mmHg
2 " =30 " "
3 " =25 " "
4 " =21 " "
5 " =18 " "
6 " =15 " "

Wt 7.5gm 1mm=51mmHg
2 " =43 " "
3 " =36 " "
4 " =31 " "
5 " =26 " "

Wt 10 gm 1mm=70mmHg
2 " =60 " "
3 " =51 " "
4 " =44 " "
5 " =37 " "

Wt 15 gm 1mm=115mmHg
2 " =96 " "
3 " =83 " "
4 " =72 " "
5 " =62 " "

During the last few years several cases of severe, permanent injury to the eyes have been reported, caused by the liquid contained in the small rubber core of certain golf balls, which have been cut open by curious children. Almost invariably the history is that some child finds an old golf ball with its covering partly off. He removes the rest of the cover and rubber and then comes to the core ball: this he bounces until it bursts, or punctures it with a knife. The contained fluid spurts out onto his clothing and into his eyes.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

The death is announced of Dr. Edward Converse of Louisville, Ky.

Dr. Samuel D. Risley was recently elected president of the Medical Club of Philadelphia.

Dr. C. M. Hosmer has located in San Diego, Cal. to practise ophthalmology.

Dr. McCluney Radcliffe has been appointed ophthalmologist to the Presbyterian Hospital, Philadelphia.

Dr. Karl Voelckers, ophthalmologist of Kiel, Germany, is dead at the age of 77.

Dr. Wendell Reber is president and Dr. Walter W. Watson secretary of the Philadelphia Policlinic Ophthalmic Society.

Dr. J. Sheldon Clark of Freeport, Ill., was recently elected secretary of the Stephenson County Medical Society.

Dr. A. Edward Davis is recording secretary of the Physician's Mutual Aid Association, New York.

Dr. Thomas A. Woodruff of Chicago, formerly editorial secretary of the RECORD, was married on February 7 to Mrs. Carrie M. Ogden at New London, Conn.

The death is announced of Dr. Robert C. Moon of Philadelphia, a widely known publisher of books and charts for the blind.

Dr. Charles C. Stuart is surgeon and Dr. William E. Shackelton assistant surgeon in the eye department of the reorganized city hospital of Cleveland.

Dr. Lee Masten Francis has been elected attending ophthalmologist to the Buffalo General Hospital succeeding Dr. Lucien Howe, who has been appointed to the consulting staff.

The following German ophthalmologists have been appointed to professorships: Dr. H. Wilbrand, physician-in-chief to the eye department of St. Georg, Hamburg; privat docent Dr. Gebb in Greifswald.

The eye staff of the Cook County Hospital, appointed under civil service rules is as follows: Drs. G. F. Suker, E. V. L. Brown, C. G. Darling and J. W. Clark.

At the meeting of the Milwaukee Oto-Ophthalmic Club held January 20th, 1914, the following officers were elected: president, Dr. Henry B. Hitz; vice-president, Dr. Franz Pfister; secretary treasurer, Dr. Gustavus I. Hogue.

At the annual meeting of the Chicago Ophthalmological Society the following officers were elected: president, Dr. Wesley Hamilton Peck; vice-president, Dr. J. Brown Loring; secretary- treasurer, Dr. Paul Guilford; councillor, Dr. William E. Gamble.

The committee for the United States of the Twelfth International Congress of Ophthalmology consists of Dr. George E. de Schweinitz, Philadelphia; Dr. E. E. Blaauw, Buffalo; Dr. Arnold Knapp, New York; Dr. A. Barkan, San Francisco and Dr. W. H. Luedde, St. Louis.

The annual report of the Cincinnati Association for the Welfare of the Blind states that no case has been known of blindness resulting from ophthalmia neonatorum during 1913. The association maintains a workshop which gives employment to a number of blind men.

The trustees of the Herman Knapp Memorial Hospital announce the opening of the new building at Fifty-seventh street and Tenth avenue, New York City. This large and well equipped hospital takes the place of the New York Ophthalmic and Aural Institute which the late Dr. Knapp founded in 1869.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. F. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
2 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) M. Frank (E. M. D.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *PaulGuilford(St.Luke's) *Casey Wood (St.Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm E. Gamble (U. of I.) Wm. H. Wilder (Rush)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
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ORIGINAL ARTICLES

THE CLINOSCOPE AS A GUIDE TO OPERATIVE EYE WORK. WITH AN EXAMPLE.

BY F. B. EATON, M. D., PORTLAND, ORE.

Among all peoples the history of medicine affords too many examples of tardy recognition of genius: America is no exception. At this present time American ophthalmologists, and indeed the whole ophthalmic world, follow more or less the teachings of perhaps the most original mind their department of medicine has yet produced in this country, only to finally balk at putting into general practice the most important and beneficent of his discoveries.

This is not the proper time or place to discuss the reasons for this over-cautious (not to say timid) attitude of his countrymen, but an attempt is here made to demonstrate the truth and practicalness of applying certain physiologic facts and certain methods of detecting the anomalous declinations of the human eye, and the surgical principles involved in their correction by operation.

A *declination*, we are taught, of the vertical and horizontal meridians of the retina, is an *anomaly;* not a physiologic or pathologic condition. A *torsion* on the other hand "results from an active adjustment of the eye, and corresponds to the position to which the eye is moved. Declinations, are purely passive states to be determined when the lines of regard are fixed in the primary position."* Normally, in spite of the authoritative dictum of Helmholtz, in the primary position the vertical retinal meridian *is* vertical, and the horizontal horizontal. This is easily proved by the clinoscope to be the case in the rather rarely normal eyes examined, and the instrument, which owes its perfection of construction to Stevens, can be built so as to be accurate and efficient at a very moderate cost.

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*Stevens. Motor Apparatus of the Eyes, p. 242.

Figs. 1 and 2 illustrate the details of construction of one made by the writer, and which required only the assistance of a cabinet-maker, and a tinker who did some trifling soldering. The wooden base and frame and their dimensions are sufficiently indicated in Fig. 1. R. is a projecting metre-measure which enables one to accurately converge the tubes to 3.50, or 4 metre-angles.

The Tubes: Length 21 Cm. Outside diameter, 35 mm. Inside diameter, 33.5 mm.

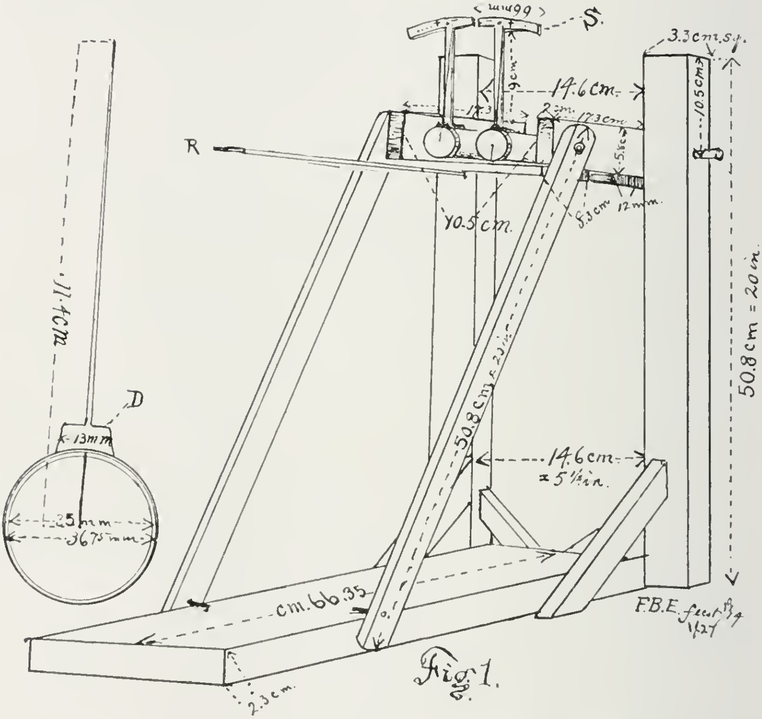

Fig. 1.

I experimented to find material suitable for a surface on which to draw the haploscopic diagrams, having never seen a Stevens clinoscope, and found it in the thin celluloid used in automobile tops for windows. A circle exactly 35 mm. in diameter was drawn with a very sharp-pointed pair of drawing compasses. From the *exact* center of the small puncture made by one foot of the compasses, a line was drawn with a very sharp-pointed pen-knife to the edge of the circle. This circle was most carefully cut out with scissors curved on the flat (of course properly, it should be cut out by a die). The two discs were then simply glued upon the rims of common paste-board pill-box lids, which happened to be rings just fitting over the tubes. Small pieces of wood (D, Fig. 3), were glued on to these, and into each a piece of steel knitting-needle No. 20, 9.2 cm. long was bored as vertically as possible, (filing one end brad-edged to do this), and the projecting portion, 8.7 cm. long, filed to a point. The distance of this point from the centre of the disc is 11.5 cm., this radius moving through an arc of 1 degree for each 2 mm. on the scale S. (Fig. 1.)*

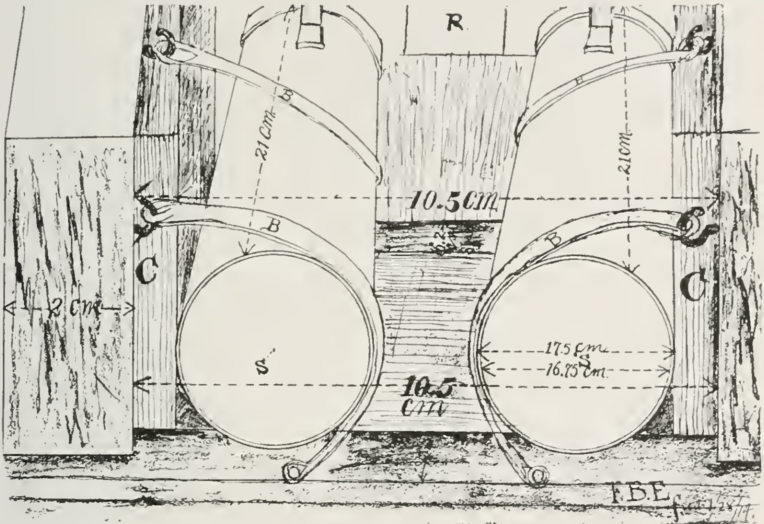

Fig. 2

A strip of metal 3.5 cm. long, 1 mm. thick, and 1 cm. wide was soldered near the ends of each tube to form legs, and the scale-T's near to the distal ends of each. At the proximal ends of the tubes are glued circular discs of thin card-board the circumference of each being accurately 35 mm. to coincide with outer circumference of the tubes. These are perforated at the exact center by a needle (s, Fig. 2).

The distance between the axes of the tubes having to be equal to the pupillary distance and to be adaptable to each patient, this is rather awkwardly accomplished by rubber bands,

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*The length of an arc of 1°, of a circle whose diameter is $1 = \frac{\pi}{360} = \frac{3.14159}{360} = .0087266$. In the present case the radius is 115 mm. Therefore, an arc of $1° = 1 \times .0087266 \times 230 = 2$ mm.

(Fig. 2, B. B.) The cards C. C. each 1/3 mm. thick being changed in number until the desired inter-pupillary distance is attained. The range permitted is for base lines from 35 mm. to 70 mm.

Needless to say, this description is not needed by those who can see their way to purchase the superb clinoscope of Dr. Stevens.

The instrument above described however, if carefully made and tested on several individuals, (each of whose declinations will be *per se*,) will serve a good purpose as a guide to operative work, when required. The haploscopic lines on the distal ends must, of course, be most carefully placed vertically by means of a plumb-line, and the zero point of the scales marked where the pointer rests. The plumb-line of silk thread should be 3 feet long, placed close to the disc, and close to the line. This procedure requires patience and is about the only really difficult thing to do. A small spirit-level is needed to see that the instrument, which should be on an adjustable ophthalmometer table, is level in all directions when declinations are being measured. Torsions can be measured up to 4.00 m. a., by means of smaller tubes.

A brief account of one of my cases will illustrate the instrument's use as a guide to correct surgery.

Mrs. W., aet. 45. Excellent health. Suffered since age of 4 from headaches starting always in the eyes. As a child left eye "turned out," but not since 20 years of age. Face worn with suffering.

Refract. O.S., +2.25S+0.50x90° : under hyoscine 3 days. Abd. 20°. Phorom. 1° Exo. to 1° Eso. No hyperphoria by any test. Cover test dist.=Exophoria 20 degrees. Convergence near point 2 inches. Field monoc. fixation O.D., 42 up; 47 down; 46 out; 44 in. O.S., 37 up; 48 down; 53 out; 42 in. (by tangent plane.) Clinoscope, repeated trials: O.D.,—3° 1/2; O.S., +4° 1/2. With such high convergence near-point, and latent divergence greater for distance than near, the case is one of Duane's primary divergence excess.

Nov. 14, 1913 did Stevens' operation of extendo-contraction on tendon of left externus (vehement opposition from patient's friends.) Immediate effect: Phorom. Eso. 2; Parallax dist., Exo. 10. Sutures out 6th day. Nov. 26, Clinoscope O.D., —2; O.S., +1.5. There has not been the slightest return of the headaches after nearly three months; patient well and uses eyes ad lib. Field, monoc. fixation; O.D., 49 out; 41 in; O.S., 49 out; 41 in. When last tested no divergence for distance by cover test. Has gained much weight. Relative range of convergence for near is rather low.

The writer holds no brief as champion for Dr. Geo. T. Stevens, who is entirely ignorant of this writing, or any intention to write it. That the writer with many others is proud to know that America has produced such a man, goes without saying. That he was numbered among the skeptics of Stevens' doctrines for six years after "Motor Apparatus of the Eyes" was on his library shelf, he reluctantly confesses, while the portion of that one-day most famous book devoted to ocular physiology has been at once his admiration and his wonder.

There are those probably, who have sincere doubts on the subject; others who are too cautious by nature or inherited traditions; among the latter apparently, can be included the authors of certain American text-books, who, while presenting in a few paragraphs a bare hint of Stevens' researches, display an ultra conservatism worthy of the land of cakes. But to a large number of earnest seekers after the truths of physiologic science, this tribute to a man too great to resent neglect or to enter into controversy, will be taken at its proper value. The argument from anatomy, through physiology and pathology, to treatment, presents a chain of reasoning well nigh without a single break, while the close and accurate experimental proof is convincing to all *candid students,* not readers only.

THE OPERATIVE TREATMENT OF MUSCULAR IMBALANCE.

BY JOS. L. M'COOL, M. D., PORTLAND, ORE.

Operations upon the ocular muscles for the correction of the different forms of imbalance require for their successful performance the most thorough study of each individual case in all its phases, sound judgment based upon a reasonable amount of experience, more than ordinary technical skill, and above all an accurate knowledge of their anatomy and physiology. Indeed the lack of any one of these requisites would seriously jeopardize the success of any operative procedure directed to the ocular muscles. On the contrary, be the conditions as regards the surgeon and patient ever so favorable, the results attained will frequently be disappointing to both—a consummation, however, not necessarily peculiar to ophthalmic surgery.

It is certainly pertinent to the subject of this paper to allude briefly to the anomalies of refraction and their correction. To direct orthoptic or surgical treatment to the muscles themselves without first determining the refraction of the eyes under the influence of a thoroughly reliable cycloplegic, and correcting it with suitable lenses is absurd and inconsistent with modern methods of ophthalmic practice. It is true that many of our best ophthalmologists differ widely in their treatment of muscular anomalies but there is certainly a striking unanimity among them in their practice of estimating the static refraction under profound cycloplegia and prescribing the proper lenses to be worn for a definite length of time before any other methods of treatment are instituted. This is certainly as it should be for we all know that many abnormal tendencies to deviation of the visual axis are the result of errors of refraction and accommodation and in consequence lenses alone will in many cases cure the muscular imbalance. To say that, failing to cure the imbalance with lenses, there is nothing left to offer the patient but operation is indeed far from the truth. Systematic exercise with prisms, neuro-muscular stimulants and sedatives, convergence and accommodation suppression and prisms in the position of rest for either constant or intermittent use all play a very important part in the treatment of these cases, and should by no means be neglected.

In directing your attention therefore to the surgery of the ocular muscles it might be well to bear in mind that the methods employed in operating for heterophoria and squint are practically identical. Their application, however, is decidedly different. In heterophoria the patient enjoys binocular single vision and we must never lose sight of the existence of this exceedingly important function when planning our operation. The prime object in changing the point of action of the ocular muscles, whether it be tenotomy, advancement or tendon tucking, is to render easy a function the patient already has but finds extremely difficult to exercise smoothly. How essential it is therefore that we shall plan our operation and execute it so that we shall not permanently destroy this function. The problems that present themselves for solution in heterotropia or squint are on the contrary quite different. Binocular single vision may never have been present, or having existed during part of the patient's life is now lost. The object in these cases is to restore the visual axis to parallelism and from the standpoint of acquiring or re-establishing binocular single vision we have everything to gain and nothing to lose. Unfortunately this is not always true with respect to cosmetic results as every operator of even limited experience well knows. Sometimes it were better to have left well enough alone.

Before undertaking an operation for latent muscular imbalance, a most careful and thorough study of the dynamics of the ocular muscles should be made so that we may know what muscle or muscles to attack and what operative technique to employ. The method of examination employed by the writer differs in no way from that of other men save probably in some of the details. It embraces a study of the muscle balance for infinity by means of the cover test, its subjective associate, —the parallax test and the multiple Maddox rod. The cover and distorting tests are undoubtedly superior to any displacement test yet devised. The examination is repeated at thirteen inches, using a small electric light as the object instead of the usual dot and line test of Von Graefe. With the small electric light the convergence near point is then determined and any marked departure from the normal noted. This represents in meter angles the converging power of the adductor muscles. The diverging power of the abductors is determined by the strongest prism base in through which the patient can maintain single vision for distance. A divergence of more than eight is excessive, less than six is deficient. The information derived from this test is invaluable and aids materially in selecting the proper operative procedure. While a study of the vertically acting muscles ought to be made the information derived is of far less value in connection with the surgery of the muscles than is that derived from a study of the lateral turners. The very nature of the test employed, i. e., maintaining binocular single vision through vertical prisms of varying degree of strength makes it impossible to tell whether the elevators of one eye or the depressors of its fellow are at fault. The field of binocular single vision should be determined in all cases of heterophoria for it is necessary to know whether any one muscle or group of muscles is paretic. If there is a true paresis and not an intrinsic weakness of the muscle, a faulty insertion or a vicious innervational abnormality no operation should be attempted until internal medication has failed to cure the condition and sufficient time has elapsed to warrant the assumption that deviation will remain stationary. With a red glass held before one of the patient's eyes and the small electric light, used in estimating the convergence near point, carried through the different portions of the field of fixation a diagnosis of the paretic muscle or muscles can be quickly made. Finally, we determine the rotation of each eye, and Steven's tropometer is the only instrument with which this may be accomplished with any degree of accuracy. Since this method is entirely objective the co-operation of the patient is unnecessary and the results obtained will depend solely upon the experience and judgment of the observer.

The perimeter may be used as a substitute for the tropometer but with it the test is subjective and therefore has its limitations. Then, too, the bridge of the nose prevents an accurate determination of the maximum nasal rotation which is not the case when the tropometer is used. While the tropometer is by no means a recent addition to our armamentarium, there is no doubt that it has added much to our knowledge of the dynamics of the ocular muscles. However, the information which may be gathered from the use of the instrument is frequently underestimated and too often entirely disregarded. After studying the rotation of over one hundred eyes, I am convinced that the proper interpretation of the tropometric findings will throw much light on many heretofore obscure problems in heterophoria and squint. Furthermore I believe that no case should be subjected to operation until the rotation of the eyes has been determined. This is especially true of dextro-and sinistrophoria and ana-and kataphoria as pointed out by Valk, Reber, and others. The solution of the many oculomuscular problems which confront the opthalmic surgeon depends necessarily upon the recognition of the influence of the neuro-muscular apparatus, controlling as it does not only the associated movements of the eyes but that infinitely more complex function, convergence. Moveover this innervational influence is and always will be paramount but I firmly believe that with the more thorough knowledge of the possibilities of the tropometer in diagnosing rotational abnormalities and a proper interpretation of its findings and limitations there will come a modification in our ideas of the proper surgical measures to employ in cases of muscular imbalance. By this I mean that instead of regarding many of these cases of imbalance as due to innervational faults, we shall come to recognize that quite a large percentage are attributable to structural and insertional abnormalities.

In the surgical treatment of muscular imbalance we have recourse to three procedures: We may either decrease the action of one or several muscles: we may increase the action of its or their antagonists, or we may do both. A graduated or partial tenotomy, a full tenotomy or an extended tenotomy will meet the first indication; an advancmeent, a resection of a portion of the tendon or a combination of both will correct those cases coming under the second classification or it may be necessary as is frequently the case in squint to combine both operations to secure the required effect. For some of the lower degrees of squint or heterophoria excellent results have been obtained by many operators with one of the many tendon-tucking operations, i. e., one which supplements the tenotomy of the primary rotators with section of a portion of the tendons of the secondary rotators. The number of methods of performing a tenotomy is limited since the technique of the operation is not particularly difficult. Not so, however, with advancements. The number of different operations that have been put forth from time to time proves that the perfect operation has not been devised. They all fall short in some one particular, but to my mind, success or failure does not depend so much upon the kind of operation as upon the skill and experience of the operator. Each man has his own way of operating, and having perfected himself in a certain technique gets just as good results as his confreres who use entirely different methods. A discussion therefore of the merits of the different procedures employed is superfluous. In my own practice I use the Worth advancement operation and find that it gives very satisfactory results. In the lesser defects such as are met with in heterophoria, I use either the La Gleyze or Savage modified tendon-tucking operation. In performing a tenotomy I usually use the open method in squint but in heterophoria I prefer to buttonhole the central portion of the tendon and work toward the periphery with a strabismus hook, stopping short of complete division of the peripheral fibres in partial tenotomy and completing the section of the fibres on either side in full tenotomy. I might say here that I have not had any experience with any of the tendon-tucking operations as performed with the more recent instruments devised for that purpose. If sufficient effect can be secured it would seem to be the ideal method, for the tendon attachment to the sclera is not disturbed—the most glaring fault of all advancement operations. If any of the members have had any experience with this method I shall be very glad to have the subject brought out in discussion.

In conclusion I should like to report three recent cases of varied interest and results. One was an unqualified success, both cosmetically and symptomatically, and illustrates well what may sometimes be accomplished in this field of surgery. The second case was also successful in that the patient was perfectly satisfied with the result obtained although the visual axes were not parallel. The third case was one that was operated upon for symptoms only, and I am forced to the conclusion after the lapse of nearly a year that so far as the patient is concerned it has been disappointing to him although his symptoms have entirely disappeared.

Case I. George B., aged 21, drug salesman, consulted me for a divergent squint of several years duration. He was wearing R.—1.00S.= —2.00 c. ax. 170°=4/45. L.—1.75S.= —2.00 c. ax. 15°=6/30. Without correction vision equaled 2/45 with either eye. The squint was monocular, the left eye fixing. There was approximately 45° divergence. Rotations—right eye, temporal, 60°, nasal 35°; left eye, temporal 55°, nasal 40°. The condition being one of squint there was of course absence of binocular single vision. I mention this because of the subsequent developments in the case. Operation was advised and eagerly accepted as any lessening of the divergence would be a decided improvement in his appearance. He was admitted to the hospital and under a general anaesthetic both externi were completely tenotomized and the right internus advanced. Before bandaging, a stitch was inserted in the episcleral tissue to the temporal side of each cornea and the ends tied across the bridge of the nose, holding both eyes in extreme convergence for 24 hours, when they were removed.

The bandage was replaced on the right eye only and after five days the stitches were removed from the right internus and the patient discharged from the hospital. As soon as the eyes were quiet enough to warrant it, the refraction was determined under full cycloplegia as follows: R.—3.50S.= —2.00 c. ax. 155°=6/12. L.—2.00S.= —2.75 c. ax. 15°=6/12. With this correction the visual axes were parallel for distance. Later when the patient fully recovered his accommodative power, I was much gratified to find that he had binocular single vision both for distance and near as demonstrated by the cover test, Worth's amblyoscope, Hering's drop ball test and bar reading. The re-establishment of binocular single vision is not at all uncommon in exotropia for the reason that, save in those cases due to a congenital palsy, binocular single vision has been present in early life and later by reason of the factors active in the production of the exotropia has been lost. Any operative procedure therefore which places the visual axes approximately parallel, provided of course that the vision in each eye is equal or nearly so, will establish binocular single vision, through the already existing well developed fusion faculty. On the contrary, in esotropia the fusion faculty is either absent or defective and even with vision in each eye equal or nearly so, it is extremely difficult after eight years of age to establish binocular single vision even though the operative result be all that could be desired. Case 2. Miss D., aged 25 years, consulted me about an operation upon her eyes. She was afflicted with as marked a case of convergent squint as I have ever seen. The deviation measured between 60° and 65° up and in, and she fixed readily with either eye—in other words the squint was alternating. Vision with following correction: R.—3.00S.= —0.50 c. ax. 180°=5/7.5, L.—1.00S.= —0.50 c. ax. 180°=5/7.5. Vision without correction was R. 5/45, L. 5/75. Rotations—right eye nasal not determined, temporal 25°, left eye nasal not determined, temporal 35°. Rotations were taken on a perimeter and therefore it was impossible to determine the nasal rotation on account of the interference of the bridge of the nose. Before operating I advised refraction under complete cycloplegia with the following result: R.—1.50S.= —1.00 c. ax. 180°=5/7.5. L.+0.25S.=+0.37 c. ax. 90°=5/7.5. Note the difference between the true refraction of the eyes and the correction she was wearing. This was worn for nearly a month with no perceptible diminution in the squint. The patient was admitted to the hospital and the following morning, under ether anaesthetic, an advancement of both external recti was performed. Both eyes were bandaged for five days, the bandage then removed and patient allowed to sit up. Two days later the stitches were removed. With correction there was a residual convergence of almost 25° when regarding distant objects which increased markedly when regarding objects at the reading distance. Three weeks later in the office, using cocaine and adrenalin in the conjunctiva and injected over the tendon, I completely tenotomized the left internal rectus. This resulted in a gain of about 15° more, leaving a residual convergence of about 10°. This case presented several features of unusual interest. Her static refraction showed compound myopia in the right eye and compound hyperopia in the left eye whereas the correction that she was wearing made her artificially a compound hyperope in the right eye and increased that refractive condition in the left. This correction undoubtedly increased the squint. The tropometric findings aroused my suspicion as to the cause of the squint and the information obtained on the operating table confirmed this. Both externi were infantile, the tendons measuring scarcely 5 mm. in width at their insertions.

We are all familiar of course with the role played by the secondary abductors in these cases of high convergent squint; but I do not remember ever having seen their action so beautifully demonstrated as in this case. When regarding a distant object the visual lines were almost parallel but as soon as the object was brought to the reading distance the non-fixing eye converged to a marked degree. The operation suggested by Edward Jackson called "extended tenotomy" in which in addition to a complete tenotomy of the internus, the nasal three-fourths of the superior and inferior recti were divided, could have been used in this case. I have never performed this operation and I suppose the specter of over effect deterred me from trying it, though the age of the patient, the degree and character of the squint made the operation applicable in this case. I explained to the patient that the residual convergence of which of course she was conscious, could be remedied by a graduated tenotomy on the left internus. However, I made it very plain to her that there was a chance of securing an over effect which would be infinitely worse than her present condition. She was well satisfied and very wisely, I think, decided against any further operation.

Case 3. Mr. H., aged 30, bookkeeper, consulted me April 24, 1912, for a persistent occipital headache, aggravated by near work. He was wearing 0^2—0.75S.=—0.25 c. ax. 180°=5/4. Examination: Eyes out under cover C. N. P. 2 inches. Abduction 13°, adduction 34°, exophoria at 5m. 10°, at 13 inches 13°, no hyperphoria. Under full cycloplegia patient selected R.—0.50S.—0.50 c. ax. 170°. L.—0.50S.—0.50 c. ax. 180°. To this was added a 1° prism base in before each eye for permanent use, supplemented by prism exercises and ascending doses of Tr. Nux. Vom. At the end of two months exophoria at the reading distance had dropped to 4° with practically no change for distance. Tr. Nux. Vom. was discontinued. After five months patient returned, complaining of the old occipital distress. The strength of the prisms for constant use was then increased to 4° and worn for one month with only fair results. At this time prism divergence equaled 18°, exophoria for distance 13°, for reading distance 14°. One month later operation was suggested and in several days I did a modified La Gleyze on the left internus. Under cocaine and adrenalin anaesthesia I laid back a triangular flap of conjunctiva over the tendon of the internus and after undermining the tendon with strabismus hooks, I put a small tuck in its fibres; this usually leaves a small tit or elevation of a portion of the tendon which may be either cut off or allowed to atrophy. The flap of conjunctiva was then replaced and held in place with one stitch. This operation corrected about one-half of the defect. One week later I tenotomized the externus of the same eye with the result that there was an annoying homonymous diplopia to the left as was to be expected. After one month this diplopia was only noticeable 35° to the left of fixation, well outside of the field of binocular fixation ordinarily employed in daily work. Muscular balance taken at this time showed: esophoria 1½° for distance and 10° for near. He complained of a drawing sensation over the internus and I therefore undermined the conjunctiva over its insertion. This seemed to relieve the condition. Two weeks later a muscle test showed: exophoria 1° for distance, esophoria 4° for near, which is the present status of the case. His headaches have disappeared and he is better in every way save for the diplopia in the extreme left field and were it not for the fact that he is a neurasthenic of the worst type and given to analyzing the slightest symptom relative to his eyes, he would be perfectly comfortable. This case has taught its lesson. When operation was discussed I said that it would be necessary to operate on both eyes. He refused, however, to have me operate on but one eye. I believe that had I insisted upon operating upon both interni, the one annoying complication, i. e., diplopia in the extreme left field caused by the tenotomy of the external rectus, would not have intruded itself into the case and the patient would have been perfectly satisfied with the result of the operation.

DISCUSSION. Dr. F. B. Eaton: This subject is particularly interesting to me, not only professionally but personally on account of a defect I myself have that has never been corrected. I took the title of the paper to indicate it to be confined entirely to heterophoria, not to squint.

At to the tropometer, Drs. Nunn and Dickson know that most of the original work that I have done has been more particularly in the muscles. But it is more important to get the field of binocular vision: to find out whether the eyes follow each other and whether the diplopia occurs at a certain point, and which eye is involved.

There is a great deal of difference in operating in cases of esophoria and exophoria. At present by the means employed, with a tendency to exotropia, we can tenotomize with great care the externi; on the matter of esophoria we have to proceed with a great deal of care.

As far as the tests are concerned, they should be made before operating. I do not think too much stress could be laid upon the amount of time and persistence in finding out what the conditions of the eyes are. We all spend too little time and get too little co-operation from the patient. The defect has been something that has been acquired during years and cannot be gotten rid of in a hurried operation. I would like to illustrate this.

I have a lady under my care who has suffered from a child of four years with headache. Afterward she had a divergent strabismus as a child. In examination there was a small amount of esophoria. There was distance abduction of 20°. She had 1° exophoria for distance. She had 1° of exophoria for near in spite of abduction of 20°. I placed her eyes under a cycloplegic and gave her glasses. She had only +.25 S. — +.50 cyl. As soon as the mydriatic was put in her eyes she was at rest, and during the time I was completing my test (two weeks) she gained ten pounds. I warned her, however, and sure enough the pain has come back. In this case it is my intention to do a tenotomy on each externus.

Under the drops she had an exophoria of 8°, but as soon as the glasses were removed it went down to 2°. With such a near point of convergence, I am justified in tenotomizing; but how shall I do it? With the diameter of the eye 25.4 m.m., one millimeter equals 4½°. It shows how careful we must be in doing these operations. I have never done a partial tenotomy. Dr. Geo. T. Stevens never divides any muscle except for declination; neither does Dr. Beard, of Chicago, who, in all his operations, button-holes the antagonist. When you freely tenotomize the superior rectus, you are apt to have paralysis. I should like to give my own case:

I began to wear glasses when I was twenty-four years of age for apparent presbyopia. My refraction is +.75 cyl., axes 45° and 135°. When Stevens published his articles in 1886 I studied them with great care. Afterwards I went to Europe. Landolt examined my eyes. I also saw Mauthner in Vienna and attended his lectures on the muscles. He demonstrated to the class my insufficiency of the interni, ignoring 3° of right hyperphoria. I made up my mind that Europe was not the place to get relief, and on my return went to see Dr. Stevens. He put on prisms, rendering 6° of right hyperphoria manifest. I think he divided the right superior rectus entirely through. Ever since then, even today, I have a very near convergence near point—within two inches of my eyes, but in reading I have an exophoria. I have convergence insufficiency amounting to 14°, with such a facultative divergence for near, the indication is for some advancement of the internus.

I want to say in closing that I believe our ways of operating on the eyes, in cases of unbalance, differ. The more we study the anatomy and physiology of the muscles, the more we see that there is a great deal more than the matter of loosening the tendon. We must regard the capsule more. I believe corrections of torsions, or declinations (a static condition) are all the coming operations. No horopter can be formed on account of certain torsions. I believe that last year Dr. Reber and Dr. M'Cool pointed out something of great value in regard to the fields of fixation in relation to heterophoria.

Dr. Bruere said that the "phorias" have always been difficult for him. He asked Dr. M'Cool at what age he would operate after other means for curing squint had been exhausted. He believes the persistent use of pilocarpin is beneficial in controlling ciliary spasm. Has never operated upon the superior and inferior recti and has not heard of any successful results by so doing. In determining the refraction he uses atropin exclusively, believing the so-called minor cycloplegics of no value.

Dr. Bailey is forced to believe from the number and variety of operative procedures employed by different men, that the results are not uniformly satisfactory. He feels that operation is indicated when refraction fails to correct the unbalance. He recommends a conservative line of treatment to follow as the percentage of lapses back to the original condition is large after operation. Me regretted that Dr. M'Cool did not speak more fully of the methods he employs in treating these cases with prism exercises.

Dr. McCollom quoted from an article by Reber of Philadelphia on the use of prisms for permanent use. He has always felt that ordering prisms was only a crutch to lean on and that you would have to increase the strength of the prism from time to time.

Dr. Nunn feels that the results obtained are uncertain and cases do not always turn out as one would desire. A knowledge of the anatomy is important. Patients are sometimes very loath to allow operative procedure upon a good looking eye.

Dr. Clement asked if there was much chance of obtaining good results from non-operative measures in a child of ten or twelve years. Has seen very few good results following operations upon the muscles.

Dr. Wright said that many cases of squint come for operation for cosmetic results only, as frequently one eye is amblyopic. Believes with Dr. Eaton that we have much to learn about the surgery of the muscles. Dr. Todd told the speaker that he had abandoned the tucking operation, as many of those cases came back with their old trouble.

Dr. Davis said that Dr. M'Cool made no mention of sinusitis as a possible cause of muscular imbalance. He cited a case in point: Right hyperphoria of 1½° after repeated examinations. Prescribed 1° base down before right eye with which patient was comfortable for five months, when her symptoms returned. Found at this time 3½° right hyperphoria. Nasal examination showed small polypus, which was removed and the anterior ethmoidal cells were exenterated. As there was only a slight amount of hyperopia, the glasses were discarded and patient has remained perfectly comfortable since.

Dr. Kistner asked whether a mal-development of the bone of the face and orbit could not produce a heterophoria; and also if it were not true that in operating after adolescence you found it difficult to treat the neuroses of their bad habits.

Dr. French has had gratifying results with prism and stereoscopic exercises and with prisms in the position of rest. Her operations for strabismus while few in number, have been successful.

Dr. Beaumont said that when Stevens first published his studies upon the physiology of the muscles, many ophthalmologists adopted his ideas and methods of treatment with more or less success. As was to be expected, there was a reaction. During the last few years, however, the pendulum has swung back, and many men are advocating and practicing this form of surgery. He feels that many cases of heterophoria may be cured by the wearing of an accurate correction and that many are reflex in origin.

Dr. Dickson said that there had been too much slashing of the muscles in former years, and complimented the speaker upon the conservative views expressed in the paper.

He has had no experience with partial tenotomies, but recalls one case referred to Dr. Stevens, who operated eight times with no apparent benefit. He was therefore rather skeptical about the results from this kind of surgery. Careful attention to the general and ocular hygiene will always have a beneficial effect upon heterophoria. In squint he prefers the Reese advancement operation. Has had occasion to use the tucking operation four times with successful results in three. He has used the Todd tucker, likes the operation, and was somewhat surprised to hear Dr. Wright say what he did about it.

Dr. M'Cool in closing spoke of the relative value of the tropometric findings as compared with the field of binocular fixation, and favored the former as giving in degrees of arc a means of estimating the strength of the lateral and vertical rotators of each eye. The tropometer afforded valuable information in the second case. From his experience in the last case, would caution Dr. Eaton against tenotomy of both externi of the patient he proposed to operate upon.

In answer to Dr. Bruere's two questions—at what age did the speaker operate for squint in young children, and whether in any instance the wearing of prisms for heterophoria lessened the deviation, Dr. M'Cool answered that he would not operate before nine or ten years. The outward swing of the orbits in a developing child would take care of a certain amount of the squint and a perfect result in a very young child might amount to an over-correction later. Prisms do not lessen the heterophoria; they frequently make the patients comfortable, which after all, is what they want.

Dr. Bruere asked whether tenotomies were done under general anaesthesia and the speaker replied, No! Tenotomies and tucking operations, the latter without special instruments, are performed under combined conjunctival and sub-conjunctival anaesthesia, while the advancements for squint are performed under general anaesthesia.

THE NATURE OF TRACHOMA.*

BY WILLIAM H. CRISP, M. D., OPH. D. (COLORADO), DENVER, COLO.

Notwithstanding a great deal of patient experimentation and histologic study, it is doubtful whether our present knowledge concerning trachoma is greatly superior to that of half a century ago. We have apparently satisfied ourselves that trachoma is a contagious disease, but the same might have been said of most of the early modern writers on ophthalmology. We are a little more positive as to the position of trachoma as a distinct disease entity than were those earlier workers. But we do not yet know what micro-organism is responsible for this specific disease. We are not even agreed as to the microscopic details which distinguish trachomatous tissue from that of several other pathologic processes occurring in the subconjunctival structures. We are at a loss to explain the basis of the relapses and recurrences to which are subject many of the patients who have once suffered from trachoma. And we are frequently unable to state positively whether a given case is or is not one of trachoma.

The ancient Greeks and Romans both described the disease. According to Hirschberg, watery eye produced by trachoma was noticed by medical men 3,400 years ago. It has been repeatedly stated that Napoleon's Egyptian army scattered trachoma over the countries of Europe. But J. Beer described trachoma in Vienna in 1792, and it must have existed in many parts of Europe long before the Egyptian campaign. The earlier writers, however, usually described trachoma rather as a symptom which might result from several diseases than as a separate disease. The fourth edition of William Mackenzie's work on the diseases of the eye, published in 1854, describes trachoma under the title of "Granular Conjunctiva." The author refers to a thickened, fleshy, and rough state of the lining membrane of the lids and especially of the upper lid, "which is a frequent and troublesome sequela of the puro-mucous ophthalmiae." The prominences which exist in granular conjunctiva, says Mackenzie, "are doubtless the villi or papillae of the palpebral conjunctiva, along with its glandular elements, hypertrophied and altered by chronic inflammation." They are "no more than . . . . the natural structures of the muco-cutaneous membrane of the eye, enlarged from inflammation."

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*Thesis for the degree "Doctor of Ophthalmology," University of Colorado.

As regards the secretion in trachoma, we are told that "the conjunctiva in the granular state secretes an inordinate quantity of mucus, which, on any additional irritation of the system, as from the use of spirituous liquors, or any local irritation, as from cold affecting the eyes, is apt to become again puriform. When this is the case, the contagious power of the original ophthalmia returns." The "vesiculo-nebulous changes" in the cornea (pannus) are regarded as due in great measure to the granular condition of the lids; but Mackenzie also believes these changes to be in part the immediate result of the same inflammation as produced the hypertrophied condition of the conjunctival papillae. Along with granular conjunctiva, it is stated, "the constitution scarcely ever fails to become affected, the patient suffering from hectic fever, with paleness, emaciation, and almost a scorbutic state of the system. It is vain to attempt the cure of the local affection, unless the constitutional ailment is removed."

Under the head of causes Mackenzie states "that granular conjunctiva may result from any puro-mucous ophthalmia . . . . A question of some importance is, whether this affection is a result of the puro-mucous affections of the conjunctiva, of these diseases being neglected, or of improper applications being made to the eye in these and other ophthalmiae." Lawrence (who wrote in 1841) is quoted as ascribing granular ophthalmia to the effect of strong applications of nitrate of silver, and in fact stating that it almost deserves to be named "lunar caustic ophthalmia." Mackenzie, himself, however, believes that "neglect of proper treatment, and especially of depletion, general and local, in the early stage of the puromucous ophthalmiae, is the most frequent cause of this affection."

Since it is probably as regards the derivation of trachoma from other infections of the conjunctiva that the present day differs most from Mackenzie's time, it is interesting to note that Desmarres, writing in 1847, apparently considered what we now regard as two distinct diseases under the one heading "Purulent Conjunctivitis of Adults"; with the synonyms "Egyptian Ophthalmia," "Ophthalmo-blennorrhea," and "Oriental Ophthalmia." "Some authors," says Desmarres, "have believed this ophthalmia not to be contagious; among others Assalini, who followed Prince Eugene in Egypt in the capacity of physician, attributes this disease to the climate of that country. . . . There are some cases in which the ophthalmia seems to lose its contagious properties." The writer quotes the case of an English army surgeon "who was in Egypt and applied to his eyes compresses covered with pus without ophthalmia resulting." But in spite of this negative experiment, Desmarres is thoroughly satisfied of the contagious character of "Egyptian Ophthalmia," and he cites the experiment performed by Cunier in 1834, in which two dogs were successfully inoculated with purulent ophthalmia. The symptoms of the disease, says Desmarres, are sometimes of "terrible rapidity," sometimes develop with a "certain slowness." The patients are capable of transmitting an acute affection long after they themselves became infected.

Hackley and Roosa's translation of Stellwag's "Diseases of the Eye," published in 1868, describes the causes of trachoma as the same injurious influences as produce catarrh, blennorrhea, etc. Contagion plays the most important part, and this is particularly effective where a great many people are collected together, and where care, cleanliness, and ventilation are insufficient. "The secretion of a pure catarrh, or pure blennorrhea, a urethral discharge brought in contact with the conjunctiva, may excite not only a blennorrhea, but also a mixed or diffused trachoma."

Bacteriology has paved the way for a more distinct recognition of some of the diseases with which formerly trachoma was more or less confounded. Several different micro-organisms have been described as more or less definitely concerned in the causation of trachoma; but none of them has stood the test. A fairly representative statement of the present knowledge or ignorance of the cause of trachoma is contained in the 1910 edition of Weeks on the Eye. Here we find the influence of filth, overcrowding, vitiated atmosphere, and improper and insufficient food briefly dwelt upon; and the author adds that "it is possible that a contagium must be added to produce the disease." Most of the section on etiology is occupied with a description and discussion of the epithelial inclusions described by Prowazek and Halberstaedter, Greeff, and others. But the only result is the statement of the conclusion, now rather general among scientific ophthalmologists, that the inclusion bodies are not proved to be the cause of trachoma. Two or three years ago, there was a rather marked tendency to regard these bodies as at least pathognomonic of trachoma. But there seems no good reason to doubt the statements made by Addario, Heymann, Pascheff, and others, that they have found the same bodies in a variety of non-trachomatous conditions, including diplococcus conjunctivitis, gonorrheal ophthalmia neonatorum, and the normal conjunctiva; as well as in epithelium from the vagina.

In view of the old confusion between trachoma and the effects of acute infectious conjunctivitis, some interest attaches to the results obtained by Owuci from inoculation of his own conjunctiva with the contents of the follicles from a trachoma patient. Three days after the inoculation there was a mild catarrh, five days after this a bacillus resembling the Koch-Weeks was present, the next day the inflammation had spread to the ocular conjunctiva and papillae had formed at the angles of the conjunctiva of the upper lid, and nine days later still there were granulations. Mutermilch frankly asserts that trachoma in no respect differs from other chronic inflammatory processes occuring in mucous membranes whose structure is related to that of the conjunctiva, such as chronic urethritis, atrophic rhinitis, etc. He cites two cases, from many that he has seen, in which there was a clear transition from an acute inflammation into trachoma. In his opinion the various bacteria which may cause acute inflammation are also of etiologic significance in trachoma; and the trachoma patient is dangerous to his environment only by way of these bacteria.

Perhaps we shall some day determine that what we now call trachoma is merely a group of symptoms arising from either of several distinct causes. Some of these causes may prove to be contagious in character; but on the other hand it may be found that many cases such as we now diagnose as trachoma in no way depend upon a local infection, but are due to remote bodily conditions, such as chronic gastro-intestinal auto-intoxication, or disease of the teeth, or of the upper respiratory tract and the accessory sinuses of the nose. We already know that either of the three causes named may occasionally underlie inflammations involving the cornea and other ocular structures. In the case which is about to be described, and which presented apparently typical lesions of trachoma, the corneal disturbances were particularly emphasized.

Mr. R. G. P., aged 40 years, was referred to me in July, 1912, chiefly on account of a severe blepharospasm. The patient was led to the office and into the consultation room by his daughter. He was wearing smoked glasses, and when these were removed, the lids of both eyes were seen to be squeezed tightly together by contraction of the orbicularis muscles. The patient appeared rather poorly nourished, and talked neurotically, giving a detailed account of knots and pains in sundry places, especially the back of his head and neck. The history began with scrofula which he stated to have affected his eyes in boyhood, but of which he remembered no details. The sight had seemed all right until seven years back when the eyes became sensitive to light, bloodshot and painful and there was excessive lacrimation. The trouble in the eyes used then to keep him awake at nights. He had been first cared for by an oculist in the southern part of the state, who called the condition keratitis. A Denver oculist later diagnosed the case as one of trachoma, and had treated the eyes on and off for eighteen months, the last treatment having been about eighteen months before the patient came to me. The lids had been sandpapered and rolled, and canthotomy had been done for the blepharospasm. The vision had been decidedly affected for about five years.

The eyes were now extremely sensitive to light. After excluding direct sunlight from the room, an attempt was made to get the patient to open his eyes. His effort to do so was a failure, resulting in opening of the mouth and tense contraction of all the muscles of the face, if not indeed of the whole body. On account of the patient's manner, and of this widely distributed muscle spasm, I was at first prepared to believe that the blepharospasm was largely of nervous origin, having perhaps been favored by the frequent manipulation to which the eyes had been subjected during treatment of the trachoma. But on forcibly separating the lids, each eye showed several corneal opacities, some vascular pannus, and a fair amount of pericorneal injection. Eversion of the upper lids showed thoroughly characteristic old trachoma scars on the tarsal surfaces. There was, however, no malposition of the lid margins.

Perhaps the most striking feature of the case was the patient's tendency to sneeze violently and repeatedly whenever the eyes were exposed to even moderately strong daylight. As soon as one had separated the lids for the purpose of examining the eyes, it was necessary to stand aside until the worst of the sneezing attack was past. These attacks did not occur in the dark room; but the eyes were so very sensitive to lateral illumination or the light from the ophthalmoscope, that the dark room examination was of little value.

For a short time the eyes were treated, without any appreciable result, at first with applications of a 2 per cent solution of silver nitrate, and afterwards with a solution of tannin in glycerin. The first summer course in ophthalmology given by the medical department of the University of Colorado was being held at this time, and Dr. Casey A. Wood of Chicago had undertaken to come to Denver and give two lectures on the treatment of trachoma. Inasmuch as Dr. Wood had given a good deal of attention to excision of the tarsal cartilage for trachoma, as advocated by Kuhnt, it was thought advisable to invite Dr. Wood to perform that operation on my patient. The operation was done under ether on July 26th at the Denver City and County Hospital. A considerable part of each upper tarsal cartilage was removed, together with the overlying conjunctiva. The patient made a straightforward recovery from the operation.

During my absence in the first half of August, Dr. Edward Jackson saw Mr. P. every few days. Powdered atropin, tannin, and ichthyol were used. Dr. Jackson stated that there was some temporary improvement during this time, but it did not last long, and the eyes continued pretty much as they had been before the operation. The photophobia, and particularly the sneezing, were still very marked.

Mr. P.'s nose was badly deformed externally, as the result of a fall from a mule in early boyhood. The septum was obviously much deflected to the right anteriorly, and the breathing space deficient. The case was manifestly not a very promising one, whatever treatment one might select, and in my anxiety to consider every possible condition which might have a bearing on the eye symptoms, I could not help feeling that it was just possible that the violent attacks of sneezing pointed to an association between the nasal deformity and the persistence of the corneal and other ocular disturbances. After a short preliminary examination of the interior of the nose, by which I satisfied myself that the septum was badly deflected, I referred the patient to Dr. W. C. Bane.

Dr. Bane did a sub-mucous resection of the septum on August 27th. No doubt as the result of the formation of scar tissue after the boyhood injury, the left wall of the nose was adherent to a marked posterior deflection of the septum to the same side. Dr. Bane stated that it was the most difficult septum operation he had undertaken; and at the first operation, owing in part to the impossibility of properly anesthetizing the posterior parts of the nose, he was only able to remove the septum as far as a point a little way back of the adhesion.

The day following this operation the congestion of the right eye was very distinctly less than it had been. The next day, however, the eye had returned to its usual condition, and no further change was noticeable until after the packing was taken out of the nose. From this time on there was a definite clearing of both eyes, the patient stated that he felt better, and he was able to open the eyes more than before. He now only sneezed on a sudden change from dim to bright light.

The patient's glasses were changed, the left eye getting vision of 1/7.5 most, and he was able to do more reading than he had done for some months. But the eyes continued to show more or less irritability and vascularity. The symptoms became much more pronounced in connection with an acute rhinitis at the end of October, and for the next two or three weeks he was quite miserable again. A second septum operation was done on November 26th. On December 10th it was noted that right eye was whiter than since the attack of rhinitis had begun. From that time there was continued improvement. On February 3rd, 1913, on examination in strong diffused daylight, there was manifest relaxation of all the facial muscles, apparently including the orbicularis; although there seemed to be a moderate ptosis of both upper lids, which produced a slight frowning expression. The patient was relatively happy, his eyes were almost completely white, and he had gained 15 pounds since first coming for treatment. This was in spite of the fact that no attempt had been made to correct a decided hypertrophy of the turbinates.

At the time of writing (May 14, 1913) the condition remains unaltered, except that there has been a marked change in the astigmatism and myopia of the left eye, the only one which gets good vision. It is impossible, of course, to say what the future of the patient will be. But at least it is evident that the condition of the nose greatly aggravated the old trachoma symptoms in the eyes. In view of the intimate relation between the blood supply and innervation of the eye on the one hand, and of the nose and its accessory sinuses on the other, it seems at least possible that the whole series of ocular disturbances in this case,—typically trachomatous in the main as they appear to have been—were secondary to the surgical defects of the nose.

318 Majestic Building.

TREATMENT OF TRACHOMA.

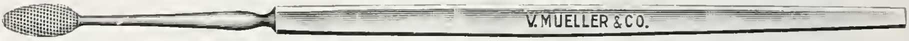
Second Stage (MacCallan's Classification).

BY CHRISTIAN H. DEWEY, M. D., WASHINGTON, D. C.

In my daily operative work as an ophthalmologist among the Indians I am required to perform a great many expression operations for trachoma.

As a large per cent of these cases are children it has caused me to look carefully for the anaesthetic and the instruments which will cause the least discomfort to the patient yet give rapidity and efficiency to my work.

The patient is prepared in the usual manner for operation then to check the smarting of the stronger cocaine application a drop of four per cent solution of cocaine hydrochloride is instilled in the conjunctival sac and repeated in four minutes. After a few minutes he is placed on the operating chair and powdered cocaine is applied to the everted lids with a dampened cotton wound applicator, especial care being given to the conjunctiva of the retro-tarsal folds and the inferior cul-de-sac, which is very sensitive. In one and one-half to two minutes the anaesthesia will permit of an almost painless expression. Though the cornea has in a few instances become steamy I have had no bad results in over a half thousand cases. The cornea is kept flooded with a warm saturated solution of boric acid during the operation. This method of anaesthesia will permit one patient to go through the preliminary preparation while another is undergoing the operation. The one in preparation gains courage when he sees that the other suffers so little, thus no time is lost in persuasion or in offering explanations.



The upper lid is everted and granules removed from the tarsal plate and retro-tarsal fold by placing one blade of the expression forceps (Prince's, Noyes' or Knapp's) in the fornix and the other over the tarsal plate, then, with firm pressure, the granules are stripped from their bed. When the tarsal plate appears to be clear of granules, grasp the superior margin of the tarsal plate with a pair of forceps (Prince's) and make a second eversion, asking the patient to look down. This gives an excellent view of the entire retro-tarsal conjunctiva where the granules are most numerous and gives an opportunity to remove every visible granule.

Not infrequently after what appears to be a thorough expression, when the debris is wiped away with a pledget of cotton, a number of granules will have been missed, especially in the outer canthus. Some of these seem to evade the forceps and are annoying to the operator. To overcome this difficulty I have devised what I call a trachoma bur,—an olive shaped bur milled in its entire circumference or having one side smooth. With a rubbing and half turn of the instrument the granules that are so elusive and so resistant to after treatment are removed.

Frequently when the granules are sparse and small I do the entire operation with this bur. It removes the trachomatous tissue readily and causes the least discomfort of any method I have used.

The lower lid is expressed in practically the same manner as the upper, but is more difficult for the beginner. The thumb nail should be placed firmly against its outer wall to steady the tarsal plate which is narrow and hard to manage with the forceps. Here the trachoma bur may be used to advantage. A repetition of the operation is rarely ever necessary if the after treatment is not neglected.

Having completed the operation the conjunctival sac is flushed with a warm solution of boracic acid or is wiped clean with a cotton pledget, one drop of 1 to 1000 adrenalin solution and one of 25% solution of argyrol are instilled. The patient is put to bed or in a comfortable reclining position and compresses applied to the eyes as hot as can be borne. These are changed at intervals of a few minutes,—the patient usually indicating when they begin to cool. To protect the hands and permit of the application of hotter compresses a wringer is made from a strip of canton flannel five or six inches wide and approximately ten inches long, with a hem on both ends sufficiently large to pass sticks for handles. The compress is placed in this and the handles twisted until it is sufficiently dry.

When the patient is free from pain,—usually in from thirty minutes to an hour, or at most, two hours the compresses are removed and after an hour he is permitted to return to his home, if near, and instructed to report for treatment the following morning. It is much better for the patient to spend the first night in the hospital.

For two or three mornings the lids will be adhered. These are usually cared for by the patient with the aid of hot water, if not, they should be opened by moistening with warm boric acid solution and the secretions loosened and removed with a pledget of cotton. The conjunctiva is flushed with the same solution and a drop of 25% solution of argyrol instilled. Light treatment should be continued daily for a week when the patient will be ready for the regular routine treatment, which is, as yet not standardized.

Since there is so much discussion as to the proper procedure after operation I will submit, without comment, a copy of the instructions I leave with the nurse who carries out the after treatment. It has given me the best results and very little discomfort to the patient.

Daily treatment for trachoma.

1. Inspect conjunctiva and cornea for abnormal conditions.

2. Flush eyes with warm saturated solution of boric acid or normal salt solution.

3. (When copper sulphate pencil is not used) Dust powdered boric acid on everted lids with cotton pledget. Use friction massage.

4. (When copper sulphate pencil is used) Instill one or two drops of four per cent cocaine solution. (For few weeks only.)

5. Apply copper sulphate pencil; one per cent yellow oxide of mercury ointment; five to ten per cent copper citrate ointment or fifteen per cent thiocinamine ointment. If ointment is used massage lightly.

6. If copper sulphate pencil is used flush out eye to remove excess of copper. (Pencil should be applied lightly to tarsal plate and fornices.)

First and second stages:

Mondays, Wednesdays and Fridays use yellow oxide ointment. Tuesdays and Thursdays use copper citrate ointment Saturdays use copper sulphate pencil. (Also Wednesdays if instructed.)

Third stage: Same as above, except on Wednesdays and Saturdays use thiocinamine ointment.

BLEPHAROCHALASIS.

Two cases of the apparently rare condition of blepharochalasis are reported by W. B. Weidler, New York (Journal A. M. A., September 27). He remarks that, thus far, all the reported instances of the condition that he has been able to find have been by foreign observers and in nearly every instance a different name has been given to it. Blepharochalasis is the term suggested by Fuchs for that condition affecting the skin and subcutaneous tissue of the lids with atrophy.

SCLERO-CORNEAL TREPHINING AS TAUGHT BY ELLIOT.*

BY EDWARD JACKSON, M. D., DENVER.

The journey of Col. Elliot, to teach in America the operation of trephining for glaucoma as he has perfected it, suggests a new method of medical education. Used with the modesty, earnestness, and regard for scientific truth which he has shown, it is one that may be productive of good results. He found everywhere operators prepared by reading, discussion, and previous use of the operation, to understand and appreciate at once each point urged, and a general interest in the subject that insured numerous and attentive listeners. From seeing him do four trephinings, and from hearing his descriptions and discussions of the operation in lectures, medical societies and private conversations, the writer has gathered certain impressions that had not before been obtained from reading about the operation, or in discussing it with other ophthalmologists.

1. Col. Elliot, from his 900 cases, some operated upon four years ago, has great confidence in the value of the operation, which he would do in preference to any other in all classes of cases of primary glaucoma. He gives as reasons for his faith: That it is a simpler, safer, easier operation for the relief of intra-ocular tension than iridectomy, or the Lagrange operation: that the proportion of cases relieved is larger: that the relief is usually permanent; and if incomplete or temporary, the operation can easily be repeated several times if necessary.

2. He attaches great importance to getting a trephine opening free from uveal tissue. This is his reason for splitting the cornea, that is lifting in continuity with the conjunctival flap the superficial layers of the cornea for one millimeter from the margin, to permit the 2 m.m. trephine opening to be made as far forward as to escape the part of the iris that may be adherent to the cornea. This is why he inclines the trephine so that the corneal edge will cut through first. Then when the circular flap is cut off with scissors the hinge that will be left will be toward the ciliary region, removing the free opening obtained that much farther from the uveal tissue. This is why when the iris prolapses, he cuts it clearly off; and then

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*Read before the Colorado Ophthalmological Society, Nov. 22, 1913.

with the irrigator causes all parts of the iris stump to draw back from the trephine opening. This is why he does not do trephining for glaucoma secondary to intumescent cataract, because the lens swelling is liable to push the iris tissue into the wound.

3. He places the conjunctival opening as far as possible from the trephine opening; to lessen the chance of intraocular infection, and the chance of closure of the opening by invasion by epithelium, as well as to secure as large an area as possible around the trephine opening, where filtration will not be affected by scar tissue. He criticises adversely those forms of conjunctival flap that are formed with an incision at the corneal margin; and regards it as unfortunate to "button-hole" the conjunctival flap in this region.

4. Technique. He makes the conjunctival incision far back as convenient from the limbus and almost parallel to it, aiming to do it in three snips, one central and one each side. Cleaning of the sclera at the limbus is accomplished by placing the scissors points at the center of the region and pushing the tissue from the center to either side. Splitting of the cornea is begun with the points of the scissors, but often extended with the point of a Bowman needle. If this is done carefully and deliberately there is less danger of "button-holing" the flap at this stage than in the trephining. To avoid "button-holing" he places the trephine on the limbus a little back from the folded superficial layer of cornea, and slides it forward in contact with the cornea, so as to push the fold of cornea before it. He prefers the hand trephine to the mechanically driven instrument. The ideal aimed at is scarcely the complete excision of a smooth round piece of sclero-corneal tissue; but rather the formation of a circular flap remaining adherent by its posterior margin, to be snipped off afterward by scissors.

5. Complications. Thickened sclerosed subconjunctival tissue necessitates more time spent in dissecting up the conjunctival flap. In these cases it is usually more difficult to split the cornea, and more time and care must be given to it. Prolapse of the iris into the trephine hole is regarded as a complication. Col. Elliot regards the operation as equally efficient if the iris be untouched. But when it shows a tendency to prolapse it must be cut off to leave a clear opening. To

do this the iris and the sclero-corneal flap are seized together by the forceps. This gives secure fixation, and complete control of the eyeball. The scissors can then be carefully applied and both prolapse and flap excised by a single snip. In one of the cases after the aqueous had welled up beside the trephine, the trephine was removed, but the opening obtained was so small that it did not drain the eye properly. Col. Elliott did not hesitate to again introduce the instrument, and rotated it until a satisfactory flap had been cut. In another case when the trephine was removed there was a smooth round hole, but the flap could not be seen. In this case the irrigator was used freely, the stream playing into the wound. The flap was soon seen in the anterior chamber; and presently was washed out with some clot that had formed there, and snipped off in the usual manner. He would, however, if necessary not hesitate to leave the flap in the anterior chamber. "What harm would it do?" Prolapse of the vitreous he thinks alway indicates deep intraocular hemorrhage. When it is noticed tl conjunctiva should be replaced over the opening as well as possible, and the eye closed. The opening in the sclera is so small that the bleeding may be expected soon to cease under the increased pressure it causes. During healing iritis is the most common complication, to be treated on the ordinary lines. Subsequent return of high tension usually means that the opening has become obstructed. The most important precaution against it, is the securing of a clear opening well out of reach of uveal tissue.

THE OCULIST AS INTERIOR DECORATOR.

BY OTTO WIPPER, M. D., CHICAGO.

While the oculist has to be physician, surgeon, and refractionist, I think that he also should be a directing adviser on interior decorations, especially for rooms in which people spend a great deal of time. Whether the eye is normal or abnormal, much can be done for its protection by suitable decorations.

I shall undertake to present in brief a few observations, which I trust may be worthy of consideration. Perfect harmony of colors and lines in our rooms will have a soothing and healthful influence upon the eye, the mind and the nervous system in general. Symptoms like headache, vertigo and others which are frequently allied with eye affections, will in many cases be greatly relieved after the aspect of a room has been changed from a disturbing one to one that is harmonious.

When looking at objects six meters away, or farther, we say that the adjusting power for various distances of the normal eye is relaxed, but ordinarily we have all indoor objects nearer than six meters, so we can readily see that within the house the normal eye is very little at rest, and the far-sighted much less so.

There isn't anything more pleasing and soothing to the eye and mind than a real pretty landscape with ample perspective; this is especially true in the fall, when the sun is less intense and a marked confusion of colors has taken place. All contours and the abundance of rich colors are softly glazed to an iridescent atmosphere. Wherever the point of sight is chosen, or in other words, whether one looks at the different parts directly, as the sky, foliage, field, water, or one takes in the picture as a whole, the influence is inspiring and restful.

Now in decorating we should aim to bring this iridescent atmosphere into the general aspect of rooms, which can be accomplished to a certain extent, without any too realistic representation of natural objects. It would not do, to have all surface covered with true reproductions of outdoor scenes; this may be beneficial to the eye directly, but it would also cause a psychological disturbance in carrying our mind away from our home, from the place which we intend to make beautiful and comfortable in itself.

In Decorative Art, natural objects are modified; this applies to color as well as to form. Outdoor scenes should be conventional, at least in color. Also the floral decorations, no matter how true the representation, should be conventional at least in their arrangement. Ornaments are composed by choosing natural objects as motives, which, with a certain amount of freedom and fancy, are combined and modified to create beautiful effects.

But I do not refer to elaborate and expensive schemes only, for things are often kept quite plain and yet the most artistic harmony may prevail in a home.

To obtain satisfactory results, the interior has to be considered in its entirety, first the purpose for which a room is to be used, next the architecture, then the furnishings, an finally the covering of surface and ornamental decorations. Every detail and feature must be in harmony with the rest of the room, and the whole effect must be pleasing and agreeable and at the same time the eye be relieved from too much near vision. Certain eye affections need special attention to make a room suit the individual case.

It is needless to say that as regards the health in general, the sanitary finish is an important factor. Sick rooms, baths, closets and kitchens should be supplied with such finish, but when it comes to the so-called living rooms (whatever names they are given) and quite often bed rooms as well, it is rather difficult to interest people in decorative schemes, which are strictly sanitary in every respect. Although, if the house is kept reasonably clean, I am sure that the good influence which artistic wall coverings, draperies, rugs, ornaments, etc., have upon the eye and mind, will amply compensate their unsanitary qualities as dust and germ catchers. The goal of all endeavor is happiness, and artistic decorations certainly contribute a great deal to the accomplishment of that end, but of course it requires study and some artistic feeling to direct and execute them properly.

Physiology divides the function of the eye into three faculties: Form-sense, light-sense, and color-sense; all three are essential to good vision.

When the form-sense is at fault, it is quite often due to errors of refraction, which may be entirely or partly corrected with lenses. Abnormal color and light-sense and many cases of abnormal form-sense are more difficult to treat and may require surgical or medical attention.

To be pleasing and beneficial to the form-sense, the shape and lines must be well designed and in proper proportion to one another; they should be graceful and also give an object sufficient character so that it conveys the impression of having a purpose. Take for instance a chair, whether plain or elaborate, the lines should be neat and its construction such as to give the impression that it is fit to sit upon. Sharp corners must be avoided, and when decorated with carvings, the latter are to be kept in a rather flat relief, without any sharp projecting points, otherwise the chair is apt to be very uncomfortable. All furniture must have the same general lines and be in harmony with the architecture of the room itself.

Whether a room is kept neutral or in a period, or in a so-called modified period, identical lines should prevail.

I don't know of anything in the line of decorating which is so frequently abused as the ornamental design; not only that the design itself is often poor, but it is also brought out too strong in color and applied too promiscuously; sometimes one sees one surface adjoining another covered with ornaments, having taken into consideration neither the architecture of the room nor the furnishings. Again we find some rather unaesthetic motives in ornamental designs; I have reference in particular to the unsightly masks and the grotesque animal heads; they may be appropriate in other places, but should be avoided in living rooms. Another objectionable article is sometimes found in the ornamental clock of the type where the poor little cupid or some other figure is making an effort to look pleasant, while carrying that comparatively heavy timepiece; rather a pitiful sight. Then we have the rugs which afford a great deal of comfort, provided they are good in design and color; otherwise they may have quite a disturbing influence, especially when the flowers and ornaments are brought out so gaudy and plastic as if they were to represent cast-iron, causing one to be careful in stepping lest one stumble.

About the light-sense, much need not be said as regards interior decorating; the subject is fairly well covered in the paragraphs of form- and color-sense. Both light and shade are essential to our well being. Plenty of sun-light is absolutely necessary in the house; it is conducive to cleanliness and hygiene; this applies in particular to chambers, baths and sick-rooms. But on the other hand, the eye must be protected from too much light; the actinic rays especially are held to be destructive. The rays of the sun and artificial light are harmful when striking the eye directly; so are the powerfully reflected rays from bright surfaces, like those of snow, water the light gray sidewalks and also the very light surfaces of interiors. Finishes with a high gloss are very irritable and must be avoided. For reading, writing and other near-work, the source of light should be behind, slightly above, and to the left.

The power of the eye which enables us to distinguish light of different wave lengths is termed the color-sense. In addition to enabling us to recognize objects, suitable color combinations contribute greatly to the enjoyment of life. Well developed color-sense is a necessary requisite to become a sucessful decorator; this of course refers to surface colors only.

We speak of light, dark and medium colors, which expresses the same as light and shade. As to their intensity, colors may be bright, pale, rich, dull, deep, neutral, etc. Figuratively the terms warm and cold colors, are used a great deal in art, according to the impression which they convey, yellow and red being warm, white and blue cold colors. On mixing intermediate shades are obtained which may be either warm or cold; so we have warm and cold shades of gray, of blue, or any other color; on the other hand a color may be neutral; for instance a brown, which is neither a yellowish, nor reddish, nor greenish brown, could be considered neutral. When colors are harmoniously blended, we term the effect iridescent.

All colors are pretty and agreeable, when properly applied. As warmth is so essential to all life, it seems natural that in most instances decorative schemes with a warm atmosphere suit our color-sense better than when the colder tints predominate. Take the gray, when used as the principal color, it should be of the warmer shades, and again be relieved by touches of still warmer hues as pink and rose, sometimes warm soft green or gold tones. I speak of gray in particular as this color usually gives rather a cold impression, but nevertheless the most agreeable and artistic effects are possible in certain rooms, when executed in the suitable shades of gray and enlivened with other colors as suggested above; although it requires a little more than ordinary care to obtain results.

Pure white is a cold affair; it reflects light very strongly and should always be toned down to the softer shades of ivory and cream.

Black or near black is seldom used on surfaces, other than woodwork, furniture and frames, sometimes as background for ornamental designs, which are rich in colors, often found in Pompeian and oriental decorations. Black looks harmonious in small quantities and in combination with rich colors, such as tan, orange, red and metallic effects; it expresses strength and character; when too much surface is kept in black, it will cause a gloomy aspect.

The bright yellows are not well tolerated when applied in large masses; they reflect strongly, and have an irritable influence: they also reflect an unfavorable tint upon the face. Much more pleasing are the modifications of yellow, like cream, ivory, echru, tan, the gold and wood tones and browns: all of these should be used extensively.

Red is considered harmful to the eye and irritable to the nervous system in general: although everybody enjoys seeing the pretty red flowers in field and garden and the bright red tints of the autumn foliage. So we learn from nature, that when sparingly used and in the right combination, red is rather pleasing. Many people feel very comfortable in a room with red as the predominating color, provided the light is pretty well shaded: and a touch of bright red here and there about the house aids in making things cheerful. Again the reflection from a red surface gives to the individual, especially when of sallow complexion, a more healthful appearance, which in turn exerts a beneficial influence upon the mind. Similar effects are obtained from the various hues, which contain a large amount of red, as pink, rose and orange.

Green and blue are found in great abundance in nature; both have a soothing influence upon the eye and mind, and are extensively used in decorating, especially the greens. It must be remembered though, that in outdoor views, colors and contours are seen in a marked degree of perspective. The colors may be very rich, but they will to the experienced observer appear soft and as having that iridescent atmosphere, previously referred to. The greens of the field and foliage, the blues of the sky and water are beautiful and very agreeable to our eyes; but the same is true of all other colors, as they occur in nature like the white, gray, drab, yellow, brown, mauve, red, etc. No matter how rich, intensive and massive the colors of outdoor views appear, we are unable to reproduce the same effect by simply covering the surfaces of a room with a layer of any green or blue. The sedative influence of blue and green is apt to become rather depressive. Another disadvantage of these colors is the unfavorable reflection upon the face, somewhat similar to that of the mirror with a green tint.

If uniform shades, especially those of saturated colors are used on a large flat wall surface, the retina becomes fatigued by the excessive amount of rays of this particular color. In toning such colors to softer and broken shades, and combining them with other harmonizing colors, they will be much more pleasing and at the same time have a restful influence. The eye objects to having a color made a definite object of observation: and it seems to be most agreeable to the retina when one of the different fields of color vision takes the leading part and is assisted by the other areas.

The sight of one color excites the vision of its complemental or opposite color as, white black, green red, yellow violet, orange blue, and vice versa. Take for example green and red: a shade of gray may appear quite neutral upon a white surface, but is will display a reddish tint if placed upon a green, and on the other hand a greenish tint on a red background. Too much contrast in color and shading is irritable, too little contrast, or a surface which is too flat becomes monotonous and tiresome: therefore a happy medium must be chosen.

Here I wish to digress for a moment from the subject of decorating, and give a few suggestions in regard to printing. All paper, used for printing, should have a dull finish and be of a neutral ivory tint. White paper and that of the different pale tints, leaning either towards blue, green or pink, soon become tiresome; and if used alternately in the same book, they have a restless influence. A decided contrast between type and background is of course necessary to make things plain. The most agreeable colors, for type, upon an ivory tint, are the deep saturated brown and the deep broken blue. It has been the author's experience that on continuous reading, the eye becomes less fatigued when these two colors are used alternately; that is where the type of two adjoining pages is kept in deep blue and the following two pages in brown. If the pages are less than 9x14 cm. in size, four or more adjoining pages may be kept in the same color of type. It goes without saying that for the usual reading matter, type should be large, with sufficient space between the lines, at least three mm. As to the length of the lines, I consider about eight or nine cm. the most suitable. Longer lines weary the eye by causing too much strain on the extrinsic muscles; they also make it more difficult to keep track of the succeeding lines. Unfortunately, many books and papers, even such that treat of the eye, have glossy paper and a type which is much too small. It is hardly believeable that this field could have ever been so neglected, causing so much harm to the eyes.

When it comes to interior decorations, it is less difficult to get suitable effects, as it is more or less in the province of the individual to have them carried out properly.

Amongst the most suitable decorations for borders and side-walls are the conventionalized reproductions of repeating landscape scenes, and even more so those with simple foliage effects; they are made in tapestries and wall paper, or they may be handpainted. Usually one color predominates, either brown, drab, a broken blue or green; others are kept entirely in different tones of either gray, drab, brown, or soft green, etc. If soft in color, and contours, they will make an ideal wall covering; they are pleasing and soothing and afford quite an amount of rest to the accommodation. The ceilings must be carried out to correspond, either blended in the lighter shades of the wall surface or in the proper tints of ivory. The finish of the woodwork is to be in harmony with the wall surface and at the same time give sufficient strength and a constructive character; if there are many dark colors in the decorations, the woodwork should be stained in the deeper shades, avoiding yellow; with lighter schemes the ivory finish goes best, or if a warmer and stronger effect than plain ivory is desired, just the trim may be kept in ivory, and the door wing and the window sill in a rich natural finish.

Another decorative scheme, of which I am greatly in favor for living rooms, dining rooms and halls, is the dull glaze finish, which may be mottled in the iridescent browns; a neutral brown or drab is the principal color, which is softly blended with either green or russet, or both; all ceilings are to be alike in a neutral dull glaze of ivory.

The so-called two-tone effects in wall coverings, with background and design only slightly differing in shades, are pretty and desirable, provided the colors are not too bright.

In bedrooms and baths the lighter shades are appropriate for wall surface as well as woodwork. A room with plenty of light and air means a clean and wholesome bedroom. Although the selection of the predominating color will largely depend upon individual taste, temperament and complexion, also the exposure of a room is usually considered. In all cases I would avoid any real bright colors. Children, normally, love brighter colors than adults, their eyes being stronger and less irritable. People of sallow complexion will favor pink and rose tints, those with rosy cheeks will prefer the pale blues and greens; others will like creams, tans, lavender and a great many will have gray with a suggestion of pink or rose. Any of these will make a suitable wall covering for bedrooms; again, the wall surface should not be treated too flat; texture patterns or the light two-tone foliage effects, and the dull one-tone mottled finishes may be selected. Neat floral designs and borders make a bedroom quite attractive. Ceilings again and the woodwork should be kept in ivory tints.

When a wall surface is to be finished plain in a uniform tone, then the softer tints only should be chosen, preferably colors of the neutral type.

As curtains are a necessary adjunct to the furnishings of a room, I wish to say that they should be somewhat toned down from the white to ivory, or cream or echru, whichever will match best with the room. Curtains should also be simple in design, as it is quite disturbing to always strike a mass of scrolls before one can look out of the window. It goes without saying that over curtains and draperies, when they are used, must also be plain and in harmony with the general scheme.

The most artistic effects are produced in rugs, although an uncomfortable disharmony may be brought into rooms by them, if they are of the unsightly, gaudy type, previously alluded to.

Pictures are of considerable importance in decorating. A house without pictures would not be very homelike. Whether the subject represented is of a joyous or sorrowful nature, the picture is considered an object of decoration. The pictures and their frames must, like everything else in the room, be in harmony with the general aspect. The wall surface has to be a suitable background; if the latter is too pronounced in color and design, it will not only be objectionable in itself, but will also be disturbing in conjunction with pictures. A picture is supposed to be an artistic reproduction, be it carried out in colors or in one tone and its modifications, hand-made or otherwise. It is rather discouraging that there is so much inferior stuff manufactured in this line. To produce a good picture, it takes more than a mess of gaudy colors, and a pretentious, frizzly frame will not improve matters. Not everything hand painted and hand-made looks well. These terms are a great deal abused often with and sometimes without intention; this tends to mislead many people, who will pay dearly for rubbish, when they could get at the same price or even less, pictures that possess more real worth, such as prints and photos with neat, well matching frames. Another objectionable matter in connection with pictures, which one often sees, are the wires or chains and hooks; they of course should be so attached that they become hidden behind the picture.

Naturally one would consider the subject of color-blindness of importance as regards interior decorations. Correct color perception is an essential factor in railway and steamship service. To distinguish between red and green in the execution and supervision of decorations, wouldn't mean any more than being able to tell a lamp post from a church tower. Although most people are able to distinguish colors and even the so-called confusion shades, I consider the majority color-blind to a certain degree, and they are not able to select the proper colors for harmonious combinations, their defect being one of culture as well as sensation. It requires a good deal of study, some artistic feeling and good vision, to create decorative effects which will protect the eye and through it have a beneficial influence upon the nervous system in general and the mind. At best the eye is a hard working and a much abused organ, and certainly deserves the kindest of treatment.

ILLUMINATION FOR THE OFFICE AND HOME.

Why is the use of glasses so frequent at the present time, as compared with only a few years ago? Perhaps the chief cause is the ignorant or careless adjustment of the light to the reading or working position. This is particularly true in the large modern office, where the chief thought in the arrangement of the desks for clerks and stenographers is economy in floor space. Proper illumination of this work is of secondary importance. Not every desk can be placed by a window, and usually windows will be found only on one side of a room, or at the end, so that ample provision has to be made for artificial lighting. Strong and even illumination is necessary. Desk lamps should be thoroughly screened so that they cannot shine into anybody's eyes. They should be so placed that there is no shadow of the hand or pen on the paper when writing. A frosted globe gives a softer light than the ordinary unfrosted globe, and a 16 candle-power lamp usually gives sufficient illumination for the ordinary desk work.

REPORTS OF SOCIETIES

ST. LOUIS MEDICAL SOCIETY, OPHTHALMIC SECTION.

JUNE 4, 1913.

Mrs. H. C. was admitted to W. U. Hospital Clinic on May 22, 1913, with the following history: Three days previous she had headache and vision in left eye began to fail. Five years ago right eye was affected and vision lost. Family history negative. Physical examination negative. Wassermann negative. Blood pressure 100. Urinalysis examination normal. Von Pirquet negative. Ophthalmoscopic examination: Right eye, old choroiditis in macular region, stellate in outline. Vision, R. E.: Shadows. L. E.: 15/150. Extending from macula, down, on outer side are large yellowish spots in choroid. The overlying retina is cloudy and gray. My reason for presenting this patient was to determine the cause of the condition, if possible.

DISCUSSION.—Dr. Ewing: Has there been a sinus examination made of this case? I think that such an examination is advisable. Dr. Parker replied there had not been any sinus examination made.

Further Report on the Case of Bitemporal Hemianopsia.

Presented at the Ophthalmic Section, March 5th, 1913. Dr. Julius H. Gross. The patient, a widow, aged 64 years, gave a history of failure of vision, dating back about six years. The general condition was as follows: She felt fairly well. Slept somewhat more than normal. Had excessive thirst. Perspired easily on left side of face and body. Had goitre, the left lobe especially was large. There was a fair percentage of sugar in her urine. Condition of eyes: Vision of right eye was nil. Left eye was 18/19. The temporal side of field, except a small part, about 15 degrees near the fixation point was dark. There was interlacing of the red and green color fields.

The pupils responded when light was thrown on the seeing part of the left retina. Wernicke reflex sign was present. The pupils contracted in accommodation. The movements of the globes were normal. The Optic Papillæ were greyish white, the fibres of the cribriform fascia were well visible: the vessels were of normal size. The X-ray picture indicated that the sella turcica had been obliterated, probably a neoplasm.

The patient was referred to Dr. Ernest Sachs, whose report follows.

SURGICAL ASPECTS OF CASE OF DR. GROSS.

This specimen obtained from a patient sent by Dr. Gross, is of interest from several points of view, ophthalmologically as well as surgically and pathologically. The noteworthy features of the case were that this patient evidently had been suffering from pressure of a pituitary tumor on her optic nerves for over five years, and though her optic nerves showed marked changes, there was no evidence of intracranial pressure or involvement. The only other symptom she had was a persistent glycosuria. As is frequently the case in pituitary tumors, there was little or no headache and no vomiting. As a rule, when these symptoms do develop, the tumor has perforated the dura and grown up into the substance of the brain.

This patient, on account of the complete loss of vision of the right eye and the partial involvement of the left was operated with the hope of saving the eyesight of the left eye. As the X-ray indicated that the tumor had grown downward and burrowed through the floor of the sella turcica, the nasal approach by the infralabial route employed by Kanavel and Cushing was employed. The specimen removed at the time of operation proved to be an adenoma of the pituitary. Forty-eight hours after operation the patient, who had been doing well and was comfortably sitting up in bed, suddenly fell over with respiratory failure, and though artificial respiration was done for sometime, as the heart was still beating, died. Autopsy revealed a large tumor, the size of a hen's egg, which had not only grown down into the sella turcica, but upward compressing the third ventricle, and causing pressure atrophy of the right optic thalamus. The tumor had grown through the Circle of Willis and this formed a collar constriction about at its middle. Besides the pancreas showed a marked hypertrophy of the Islands of Langerhans, which accounted for the glycosuria. (The specimen was demonstrated as well as sections showing the tumor and degeneration of optic nerves and chiasm.)

Now as to the operative procedure in these cases. Some have advocated a route through the nose, while others, notably McArthur and Frazier, have advocated turning down a large frontal flap and resecting the supraorbital plate, and Horsley has done a two stage craniotomy, lifting up the temporal lobe and approaching the pituitary from the side. In my opinion, no one of these methods is to be used to the exclusion of all the others, and it has been my feeling that in those cases where the tumor had grown downward into the sphenoidal sinus, the better approach was through the nose—and where the tumor had grown up, the method of McArthur was more desirable. In this case no operative procedure could have been of any avail, in view of the relation of the Circle of Willis to the tumor. Furthermore, there was no way, whatever, of determining beforehand that the tumor had grown upward into the brain, as was shown by autopsy. The most we can hope to do in many of these pituitary cases is to relieve symptoms and save the eyesight. Removing the tumor in this region will, in the majority of cases, I believe, not be possible, unless they be cystic. This case, however, again emphasizes what I have said before that in order to help these people at all, we must see them early in their disease before the process has advanced to the stage such as this one had.

DISCUSSION—Dr. Hoge: I might ask if there were any motor or sensory symptoms found?

Dr. Sachs: None whatever.

Dr. Luedde: I would like to ask Dr. Sachs if there is greater danger of postoperative infection in the intra-nasal method than in the external cutaneous operation?

Also Dr. Sachs' reference to the presence of sugar in the urine as an early sign of pituitary disease, reminds me of a case which I saw about four years ago. This was a young lady about 22 years of age, referred to me from Springfield, Ill., on account of extensive hemorrhages in the retina in one eye which the examination by an oculist there had revealed several weeks before. The patient had been told she probably would die soon on account of serious kidney disease. The fact that only one eye was involved, the other eye being perfectly normal, caused me to insist upon a very careful nasal examination. This examination by Dr. Sluder revealed a severe sphenoidal suppuration. The examination of the urine made by the late Dr. Rush showed a small per cent of sugar and a trace of albumin. In the absence of careful examination of the nose, the presence of sugar in the urine might have been taken as an indication of diabetes, thus the hemorrhagic condition in the retina could be accounted for by severe constitutional disease. However, with the clearing up of the sphenoidal suppuration, the sugar disappeared from the urine. Dr. Sluder and myself considered this an evidence that the severe infection of the sphenoidal sinus had produced some irritation of the pituitary body. The patient has been under observation repeatedly since that time; there has been no recurrence of sugar in the urine, the retinal picture returned to normal, and vision is perfect in each eye. I have referred to this case because it was one that made a profound impression on me at the time and has fixed in my mind this symptom of sugar in the urine to which Dr. Sachs has referred in connection with early diagnosis of pituitary disease.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of November 22nd, 1913.

DR. EDWARD JACKSON, PRESIDING.

Dislocated Lens.

Dr. W. F. Matson presented a girl aged fifteen years, whose left eye had been enucleated on account of a probably sarcomatous growth in the fundus, and whose right eye showed a dislocation of the lens down and in. The lens of the eye which had been enucleated was also luxated, and both eyes had had attacks of glaucoma. The pupil contracted well under eserin, with improvement of vision. A minus 10 D. lens was worn over the right eye.

DISCUSSION. Dr. Coover stated that he had seen the patient in July, 1911, shortly before the left eye was enucleated, when she was suffering intense pain from glaucoma.

Dr. Black favored removal of the lens. He would try needling, subsequently doing linear extraction if glaucomatous symptoms developed.

Dr. Jackson would keep the pupil contracted with a miotic, and leave the lens as long as the eye behaved well. If extraction proved necessary he would be inclined to remove the lens as a whole with a Levis loop. If the lens got into the anterior chamber before operation, he would contract the pupil with eserin before extraction. Dislocated lenses were usually smaller than normal, and so were less likely to cause trouble if they dropped into the vitreous.

Serous Uveitis with Exophthalmos.

Dr. Melville Black presented a case of serous uveitis in a man of forty-seven years, which had at first simulated glaucoma by apparent increase of tension, and was also of interest on account of an exophthalmos in the affected eye The cornea was not entirely clear at the first examination. There was exophthalmos of about 5 mm., which had now diminished to one-half that amount. No explanation of the protrusion could be found in the nose. The Wassermann test was absolutely negative. The iris was slightly discolored and engorged, but there had been no pain, although pericorneal congestion was marked.

DISCUSSION. Dr. Patterson was not satisfied that there was no nasal complication. He would have a skiagraph made, in view of possible involvement of the posterior ethmoid cells.

Dr. Sedwick remarked that the patient had a very badly diseased molar tooth. A year previously he had seen a similar case, with pain and decided proptosis. The man's dentist had reported that there was no trouble with the teeth. Two or three months later there was a further attack, and another dentist found and pulled a diseased tooth at the root of which was an abscess. The patient had had no trouble since that time, and had gained greatly in weight.

Dr. Bane, speaking of the influence of old gonorrhe infections in producing uveal inflammation, mentioned a ca recently shown by Dr. Brown Pusey of Chicago, in which afte twenty years of liability to recurrent iritis, cure had resulted from the use of gonococcic vaccine.

Dr. Strader referred to a case he had seen, in which there had been a small corneal ulcer and some proptosis, with iridocyclitis: and in which the eye had looked practically well the day after extraction of a diseased tooth.

Dr. Crisp referred to the case of a man whose gonorrheal infection dated back twenty years, but who for the past twelve years had had recurrent attacks of iritis, the first of which had been contemporaneous with gonorrheal arthritis.

Optic Neuritis from Ethmoid Disease.

Dr. H. R. Stillwill presented a woman aged twenty-eight years, who had come with a history of blindness suddenly developing a week earlier in the right eye. Examination of the right fundus had shown enlargement of the veins, and some haziness at the inner margin of the disc. The left fundus was negative. On September 19 the rhinologist removed polypi and curetted the ethmoid cells. The patient stated that the vision of the left eye had become very poor the day before operation. The vision of the right eye, which before operation had been shadows, had improved to 20/40 on September 29, the vision of the left eye on this date being also 20/40, as against 20/20 at the first examination. Since then the ethmoid cells on the right side had been curetted once and on the left twice, and a few cells still remained to be removed on the right side. The sphenoids were negative. The vision of each eye was now 20/20. The left eye showed a small hemorrhage at the temporal margin of the disc, and both discs were still hazy.

DISCUSSION. Dr. Finnoff, who had assisted at the nasal operation, stated that the polypi had completely obstructed both sides of the nose. Immediately before the first operation the patient only had light perception in each eye, and the vision commenced to improve noticeably the second or third day.

Dr. Coover thought an X-Ray examination desirable in all such cases before and after operation.

Injury from Explosion of Dynamite Caps.

Dr. G. F. Libby presented a man aged thirty-two years, who on October 1st had received injuries due to the explosion of a box of dynamite caps. The right eye had a penetrating wound through the sclero-corneal limbus, with a small iris prolapse, and there was hyphema in both eyes. The vision was light perception. X-Ray examination showed pieces of copper in each orbit. It had never been possible to get a good fundus reflex from either eye. The blood had disappeared from the anterior chambers after about five weeks. The left pupil looked perfectly clear and there was no lens opacity, yet the fundus could not be seen. Was this due to hemorrhage in the vitreous? The tension was minus in each eye.

DISCUSSION. Dr. Coover thought there were foreign bodies in the eyeball.

Dr. Black referred to a case in which a piece of copper had stayed for many years in an eye which nevertheless continued healthy. He mentioned another case in which, although no view of the fundus could be had for a long time after the injury, vision of 20/20 was finally obtained; but the eye was later lost from retinal detachment, probably due to the old retinal scar made by the copper fragment.

Dr. Jackson thought that the absence of reflex in the left eye was probably due to blood in the vitreous.

COLORADO OPHTHALMOLOGICAL SOCIETY.

MEETING OF JANUARY 17TH, 1914.

Dr. A. C. Magruder, presiding.

Burn Due to Molten Iron.

Dr. F. E. Wallace presented an iron molder who on February 1, 1913, had received a splash of molten iron in the right eye. Four pieces of iron were removed from the cul-de-sac by the general physician. In spite of all treatment extensive adhesion of the lower lid to the cornea had developed. The corneal burn had been so deep that the anterior chamber was almost perforated. After symblepharon appeared inevitable the lower lid was loosened from the eyeball and the defects covered partly with grafts taken from the left eye and partly with a conjunctivival flap from the uninjured part of the right eye. The symblepharon was now worse if anything than before operation. The only thing left to do appeared to be a skin graft. Rather more than half the pupil was visible through the cloudy cornea, and the eye counted fingers. The bridge of adhesion had steadily advanced on to the cornea from an original point of attachment in the lower cul-de-sac.

DISCUSSION.—Dr. Black thought the case a very difficult one. In making a skin graft it might be well not to attempt to pare the new tissue from the cornea at the time of grafting, but to leave that step until the inferior cul-de-sac had been re-established, in order to avoid fresh adhesions.

Dr. Jackson would use a skin flap an inch and a half wide, on account of the shrinking which was sure to occur.

Burn from Caustic Soda.

Dr. W. C. Bane reported the case of a man who, while cleaning out a hose, had received a splash of the cleansing fluid into the left eye. The palpebral and bulbar conjunctiva and part of the cornea were burnt. On chemical analysis the cleansing fluid proved to be almost pure hydrate of soda. When the patient was seen twenty-four hours after the accident, the burn did not seem to be severe, but next day the cornea looked hazy. The use of vaseline in the eye seemed to make it worse, and on Dr. Black's suggestion, a vegetable oil was used to advantage. This was the first case in which Dr. Bane had seen vaseline disagree with an eye. Collodion used in the lower cul-de-sac seemed to give very good results in preventing adhesions. In applying it the lower lid was everted as far as possible, a spatula held against the globe, and the collodion put on with a cotton brush. There was now an opacity three or four millimeters wide at the center of the cornea. The outer surface of the lid showed some wrinkling from the scar tissue, and would probably later be drawn away from the eyeball.

DISCUSSION.—Dr. Black remarked that an extraordinary feature of this case had been what might be called a phimosis of the conjunctiva around and over the cornea, only one-fourth of which was for a time left exposed.

Dr. Neeper had been much pleased with the use for this class of case of dental paraffin sheets. These could be cut into any desired shape, and so made to fit the whole conjunctival sac, both above and below, a hole being cut in the center to correspond with the cornea.

Buphthalmos.

Dr. James A. Pattee presented a girl of four years whose right eye was greatly distended and almost blind. At the age of a week or ten days the parents had noticed that the eye was reddish, although there was no discharge; and when the child was about ten months old people began to notice that the eye was large. The cornea was hazy, and its diameter much greater than that of the other eye. The anterior chamber was deep, tension above normal, and the optic disc very much excavated, the retinal vessels breaking off sharply at the edge.

DISCUSSION.—Dr. Jackson said that it looked like a rather mild case of juvenile glaucoma or hydrophthalmos. If the eye continued to enlarge, he would be inclined to try the effect of trephining. But some of these cases seemed to have remained stationary.

Splinter of Wood in Anterior Chamber.

Dr. E. R. Neeper presented a boy of thirteen years whose right eye had in March, 1913, been injured by a splinter of wood. The outer portion of the splinter was pulled away, and a spicule 3 mm. long and of hair breadth was left in the aqueous, extending from the lens to the posterior surface of the cornea. This was removed with great difficulty through a keratome incision made near the limbus. The vision of the eye was now 20/20—1. There was a tiny corneal scar, a delicate scar representing the point at which the anterior capsule had been punctured, and a peripheral anterior synechia corresponding to the keratone incision. Dr. Neeper emphasized the importance in such cases of bringing the eye immediately under the influence of a cycloplegic.

Optic Atrophy from Cranial Injury.

Dr. E. R. Neeper presented a girl of eleven years who at the age of six years had bumped her head violently against that of a playmate, striking the left temple. She was blind and semi-conscious for one week. Vision had failed gradually since the accident, and was now equal to counting fingers at from five to ten feet. There was horizontal nystagmus, and the optic discs were quite white.

DISCUSSION.—Dr. Black: These cases were usually monocular, the fracture being commonly supposed to involve the apex of the orbit. In this case there had probably been an intracranial hemorrhage.

Dr. Patterson referred to a case of cranial injury in which when first seen the nerve head was swollen. It had proved to be a case of fracture at the base of the skull.

Dr. Neeper mentioned the case of a man who had been beaten up while drunk. Vision was absolutely lost from the time of the injury. There were repeated hemorrhages from one nostril, and though at first nothing abnormal could be seen in the fundus, the later appearance was that of complete atrophy of the optic nerves.

Herpes Zoster.

Dr. E. R. Neeper presented a man of fifty-four years who had had a herpes zoster involving the right side of the face and the right eye, but exceptional in that there was an extension of the vesicles over the lower half of the left side of the nose. In the earlier part of the attack there was moderate delirium. The congestion of the right eye had been most marked in the lower nasal quadrant, and the eruption on the right side was chiefly limited to the nose. While the first complaint of pain referred to the eye, the appearance of the eruption on the nose was followed by severe cyclitis. There was a history of working hard and cooling quickly a few days before pain began. The neuralgic pain was on the right side of the head, and did not involve the disturbed area on the left side of the nose.

DISCUSSION.—Drs. Bane and Crisp referred to a case recently seen, in a patient who had been sent to the isolation hospital for supposed erysipelas. The ocular disturbance had been limited to some peri-corneal and conjunctival congestion, photophobia, and a slight contraction of the pupil on the affected side, on account of which atropin was used.

Interstitial Keratitis Following Small-pox.

Dr. A. C. Magruder presented a man aged thirty-six years who, after a mild eruptive illness which by the patient's description must have been small-pox, had developed an inflammation of the right eye. He also gave a history of exposure to severe cold not long after getting over the general ailment. The eye had not been involved at the time of the general eruption. When seen on December 26, 1913, there was a general ground glass appearance of the entire cornea except the upper central area, which was clear enough to give an indistinct view of the pupil. There was a complete posterior synechia. Nocturnal pain and photophobia were intense, and there was extreme congestion of the conjunctiva. The upper central part of the cornea now showed what appeared to be a large abscess in the corneal substance. The onyx had for some time been ring-shaped, the center being much clearer. It had never been possible to stain the cornea. There was no history of syphilis. The treatment used had included atropin, potassium iodide, mercury, the high frequency current, dionin, and general tonics. In order that the patient might pass a fairly comfortable night, it had been found necessary to use the high frequency current at about three or four p. m.

DISCUSSION.—Dr. Robinson had seen a case of interstitial keratitis following small-pox.

Dr. Patterson favored making a Saemisch incision in Dr. Magruder's case.

Scleral Trephining for Glaucoma.

Dr. A. C. Magruder presented a man on whose right eye scleral trephining had been done seven months previously for the relief of severe pain. The vision of the eye had been entirely lost before operation, and was not recovered; but the eye had been comfortable since. The pain in the eye had been accompanied by pain in the ethmoid area, which persisted after the eye operation, so that an exenteration of the ethmoid was done four days after trephining.

Intracranial Tumor. Choked Disc. Hemianopsia.

Dr. A. C. Magruder presented a woman aged forty-four years who since the beginning of the first menstruation after the birth of her last child, six years back, had suffered from severe headache which had never entirely left her except for a few days midway between her periods. Of late she had never been entirely free from headache. Severe pain usually came on about one a. m., with such severity that the patient had to get up and walk the floor. She had frequently lost consciousness. There had been ten children of which eight were living; and only one miscarriage. Examination of the nose, and the Wassermann reaction, were negative. In the past six years the patient had taken on fat to a marked degree. Both discs were choked, and the visual fields showed left homonymous hemianopsia. A skiagraph indicated no enlargement of the sella turcica, but a shadow in the sphenoid region. Examination of the urine after the ingestion of glucose suggested pituitary involvement. The internist and neurologist confirmed the diagnosis of brain tumor, and spoke doubtfully of the advantage of a decompression operation.

DISCUSSION.—Dr. Black thought the patient should be given the possible benefit of a decompression operation, by which the headaches were likely to be relieved and the vision improved to a marked degree.

Dr. Jackson suggested that the connection of the headache with menstruation might have some importance. Cessation of menstruation at an early period in life was one of the symptoms in some cases of pituitary involvement.

Dr. Black mentioned the case of a woman who after childbirth in September last had noticed a disturbance of vision, of which however there had been some beginning during the previous year. The tumor was diagnosed as situated subcortically in the right parietal region. Insertion of a trochar behind the Rolandic area of the brain opened a cyst containing about five ounces of fluid. The patient died not long afterward.

(Dr. Magruder reports later that his patient died on the operating table after taking one dram of ether, and before an incision had been made. At autopsy an almost globular, hard, encapsulated tumor 70 mm. in diameter was found in the posterior part of the right occipital lobe. The anterior aspect of the tumor was almost in relation with the optic chiasm. There was also a small cyst of the hypophysis.)

William H. Crisp,
Secretary.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Frank Brawley of Chicago has returned from a visit to the South.

Dr. Casey A. Wood of Chicago is spending a short vacation in California.

Dr. George E. de Schweinitz of Philadelphia, recently received the honorary degree of L. L. D. from the University of Pennsylvania.

The Baltimore Eye, Ear, Nose and Throat Hospital is to have new quarters providing about fifty beds, the structure to cost $50,000.

Dr. Henry M. Childress has resigned as ophthalmologist to the Children's Hospital, Paducah, Ky., and Dr. Henry G. Reynolds succeeds him.

Dr. Russell W. Raynor of the staff of the Presbyterian Eye, Ear, Nose & Throat Hospital, Baltimore, is doing trachoma work for the government in Kentucky.

Drs. Edgar R. Russell, Joseph B. Green, and Rufus G. Buckner constitute the staff of the Eye, Ear, Nose & Throat Department of the Merriwether Memorial Hospital, Asheville, N. C.

Investigations instituted by the U. S. Public Health Service disclosed 450 cases of trachoma in Louisville, Ky., and 176 cases among 4,558 children examined in the county outside of the city.

FOR SALE by Henry Kimpton, Medical Bookseller, 263 High Holborn, London, W. C., England: THE OPHTHALMOSCOPE. A Monthly Review of Current Ophthalmology. A complete set, volumes 1 to 13, 1901 to 1913, in parts as issued, for $100.00.

A Chicago newspaper states that a spark from an electric arc ignited a celluloid eyeshade worn by a workman causing burns that resulted in the man's death. This story reveals a danger involved in the use of a very common form of protection to the eyes.

The Central-Bureau of the XII International Congress of Ophthalmology, which convenes at St. Petersburg next summer, announces that the Russian government has authorized free entrance and unlimited stay in the country to all members of the congress.

An interesting revival of an ancient and absurd superstition is indicated in an item from Aurora, Ill., according to which, a photograph was taken of the eye of the victim of a recent murder mystery with a view to finding upon the retina the image of the last object seen before death, thus identifying the murderer. The item states that the picture was taken by the advice of an oculist.

The next meeting of the Oxford Ophthalmological Congress will be held July 8th, 9th and 10th. The important subject of "Workmen's Compensation in Injuries of the Eye" is to be discussed. Among the guests of honor are to be Dr. Darier of Paris, Professor Deutschman of Hamburg, Dr. Casey A. Wood of Chicago, and Dr. Wendell Reber of Philadelphia.

REPRINTS

Three Tumors Arising in Sweat Glands. By George Coats. Reprinted from the Royal London Ophthalmic Hospital Reports, Vol. XVIII, Part III.

Uber Retinitis exsudativa (Rentinitis haemorrhagica externa). Von George Coats. (Mit 5 Tafeln.) Sonderabdruck aus: "v. Graefe's Archiv für Ophthalmologie." LXXXI Band. 2 Heft. Leipzig, Wilhelm Engelmann. 1912.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) M. Frank (E. M. D.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

Vol. XXIII CHICAGO, MAY, 1914 No. 5, New Series

ORIGINAL ARTICLES

GLAUCOMA AS A CONTRIBUTING ETIOLOGICAL FACTOR IN INSANITY WITH REPORT OF A CASE.*

BY CARROLL B. WELTON, M. D., PEORIA, ILLS.
OCULIST AND AURIST TO ST. FRANCIS HOSPITAL.

The failure of the family physician to recognize cases of inflammatory glaucoma usually ends in the consequent destruction of the patient's sight. Instances of this are on record and as much as we dislike it, they keep occurring from time to time. The most recent publication of such a catastrophe is by Randolph, who reports the case of a man brought to him ten days after such an attack of glaucoma, absolutely blind, having no light perception,—who had been treated by the family physician, during a period of ten days for an attack of "Grip," and who in spite of the fact that the patient's vision during all this time had been growing less each day, had assured the man that the sight would return as soon as the "Grip" had left him. Randolph says "that it never seemed to occur to his physician that he was suffering from glaucoma." For the complete history of this case, I would refer you to the original article in the Ophthalmic Record, January, 1907.

The recital of such an unfortunate occurrence is to be deplored, but the case I wish to report is even more disastrous than this one in its effects to the patient. Especially unfortunate are these cases when we know that results of this kind are entirely avoidable, if the disease is recognized and operative measures instituted immediately.

If there is one operation in the whole field of surgery that gives promise of saving a patient his vision and which is almost magical in the instant relief from pain which it affords, it is an operation upon the eye for the relief of high tension in acute glaucoma. Consequently it seems almost beyond belief that such cases as these can end so unfortunately.

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*Read before the Chicago Ophthalmological Society, March 16th, 1914.

The sequence of events, in the case which I saw, were, that the patient developed a glaucoma, the disease was not recognized by the family physician and she never at any time was examined by an oculist. Her physician administered opiates for several months, to relieve the intense pain in the eyes, until she became absolutely blind. Her mind then became affected, she was adjudged insane, and committed to an Insane Asylum, where she now remains.

Of course it is always debatable in a disease with persistent intense pain, ending in insanity, whether the conditions producing the pain or the measures used to alleviate the pain, are the cause of the resulting mental condition. It seems to me, however, in this case, the persistent intense pain this patient suffered and which was protracted over a period of several months, that the glaucoma then becomes an etiological factor in the production of her insanity—at least it is plainly an indirect cause.

The history of the case is:—Mrs. Julia W., age 69, was admitted to the Peoria State Hospital for the Insane, December 9th, 1912. At the time of her commitment the insanity had been present four months. Her history shows there is no insanity in her immediate family, nor in the family of either parent. Her father died at the age of 80 and her mother at 84. Patient had the common diseases of childhood. Her general intellect as a child was considered good and knowledge was acquired rather rapidly. In adult life she had a strong constitution and her only illness has been several mild attacks of inflammatory rheumatism.

Her nervous system has always been normal. Her general intellect was above the average and her social position was good. She has been pregnant seven times, having six normal confinements and one miscarriage. All six children have reached adult life and are in good health, the eldest being 52 years of age.

She never had any disease of the eyes and her vision had always been good until September, 1911, when she developed an eye trouble in which the eyes became painful, sensitive to light and her vision began to fail. This condition of the eyes grew worse until three or four months later, the pain in the eyes became so severe that she had to be given opiates continually to relieve her.

She continued to use drugs, which were given to her by her family physician for several months for the intense pains in the eyes, until September, 1912, when she became totally blind.

She had, during this period, up to the time that she lost her sight, taken large amounts of morphine to relieve her intense suffering. She also worried a great deal about her condition. At this time her mind became affected and insanity developed.

The onset began with decrease of memory and intellect and some insomnia. She was depressed, quite sad and had a constant fear of becoming insane. At times she would become excited, somewhat noisy and quite restless. She was also suspicious and somewhat irritable. During these attacks she became confused and several times made suicidal threats. She had delusions of persecution and believed that someone was trying to poison her. The mental condition grew rapidly worse, and she was adjudged insane and committed to the State Hospital at Peoria.

The records at the State Hospital when she was admitted show that she was completely disorientated regarding place, she thinking that she was in a hotel, neither did she know the season of the year, believing it to be spring. She says the nurses continually beat her with brooms and chairs or anything they could lay their hands on. She has hallucinations of hearing and says that she can hear her children and also her friends talking to her.

Emotionally the patient was inadequate. She frequently cried without any apparent cause and constantly requested to go over to another building to see her relatives.

During her stay at the receiving cottage, she was confined to her bed and had to be carefully attended to. The use of opiates had been discontinued at the time the patient entered the Hospital. She was in a confusional state, and would attempt to leave her bed. She spoke in an irrelevant manner. Several times she struck her head upon the bed receiving discolorations of eyelids and face.

The physical examination showed a woman reduced in weight from 200 to 160 lbs. The lungs are hyper-resonant and show a few mucous rales at the bases. There is an emphysema of the lungs. Left ventrical of heart is hypertrophied. A slight systolic murmur is heard in the apical region, the heart sounds not being very distinct. Blood pressure 190. Abdominal parietes are relaxed—no tumor or tender areas are present. Superficial reflexes are diminished—deep are normal.

In April, 1913, when I first saw the patient, she had recovered her mental faculties to such a degree, that at this time, she could carry on a fairly intelligent conversation, knowing who and where she was, and could clearly tell the conditions and circumstances of her past life up to the time that she had begun the use of drugs. The woman complained of continual pain in the eyes. Examination of the eyes showed her to be totally blind in both eyes, she having no light perception. She presented the typical picture of an absolute glaucoma. Both eyes were injected and painful to the touch. The corneal reflex in each eye was dulled. The cornea was somewhat opaque and its sensitiveness lost—the whole eye being in a state of glaucomatous degeneration. The globes are ectatic, the pigment epithelium of the choroid being visible in several places through the thinned and bluish sclera. The anterior chamber was obliterated. The pupils were dilated, unequal in size, the pupillary margins irregular and neither reacted to light or accommodation. The lenses are partially opaque, and no reflex can be obtained from either fundus. The tension taken with the Schiötz tonometer, measures in the right eye 70 mm Hg., that of the left 75 mm. Hg.

An operation was advised, not of course with the expectation of restoring any vision, which was out of the question, but simply to relieve the pain caused by the increased ocular pressure. On May 19, 1913, under ether anesthesia, an Elliot trephining of the sclera was performed on each eye. The sclera which was extremely thinned, was easily pierced by the trephine, the piece removed and a small button-hole iridectomy made. A prompt recovery followed. On December 23, 1913, the patient was again examined, and there was no injection of the eyes and no pain or tenderness present in either. The tension was again taken with the tonometer and registered in the right 13 mm. Hg. and in the left eye 55 mm. Hg. Why the patient did not have pain and tenderness in the left eye which still registered 55, was, I believe, due to the highly atrophic condition of the eye from the long continued high tension. At least with this tension still remaining after the operation she had no discomfort or complaint, and the advisability of a secondary operation was not considered.

Cases of this kind simply show the necessity of educational work being done by oculists among the men engaged in general practice, for the purpose of promoting the earlier recognition of symptoms indicative of a grave eye disease. When a physician is called to see a patient who is having pain in the eyes or in whom the vision is rapidly failing, it becomes at once his duty to know by means of competent help, whether or not he has to deal with a serious disease of the eye.

RETINO-CHOROIDITIS JUXTA-PAPILLARIS.*

BY LEIGHTON F. APPLEMAN, M. D., PHILADELPHIA, PA.

Retino-choroiditis juxta-papillaris is a name applied by Edmund-Jensen to a localized inflammation involving the retina and choroid immediately beyond the disc. It occurs in young, healthy adults without a history of lues or other dyscrasiae, and presents a characteristic, absolute scotoma involving the region of the blind spot and extending to the periphery.

In 4 cases which he reported (Arch. f. Ophth., Aug., 1908), the diseased area was at the upper margin of the disc in 1 case, at the inner margin in 1, and at the lower margin in 2. Blessig suggests the name Chorioretinitis Parapapillitis.

The following case, which I beg leave to report, belongs to this category:—P. M., aged 21, consulted me in March, 1913, because of slight blurring of vision and slight pain in his left eye. This had appeared 3 days previously, with pain near the inner canthus, extending upward to a point in the forehead just above the brow—not radiating. He stated that the blurring seemed to be increasing since he first noticed it. No other asthenopic symptoms were complained of. He gave no history of lues or other infection. The urine examination was negative.

Without glasses, vision equaled 5/6 in each eye. This was increased to 5/3 in the right, and 5/4 in the left eye with his glasses, which he had worn for one year, and which consisted of + 0.25 sph. + .25 cyl. ax. 90° in the right, and + 0.25 sph. + 0.50 cyl. ax. 90° in the left.

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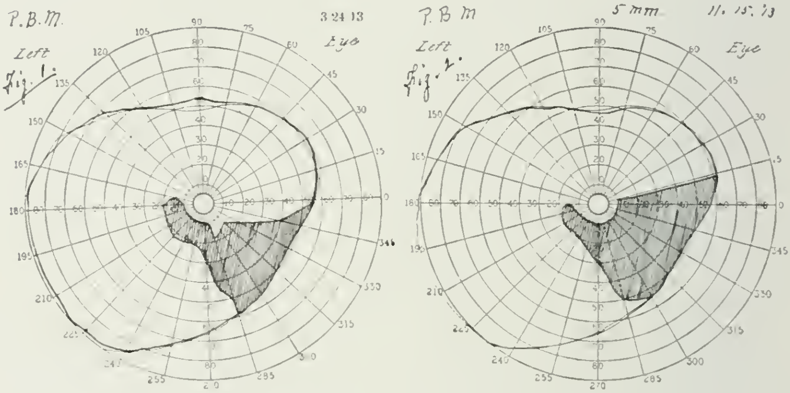
*Read before the Polyclinic Ophthalmic Society, November 11, 1913.

Upon ophthalmoscopic examination after mydriasis, I found the media clear. The disc was swollen + 3 D., and its edges were obscured. The swelling extended into the retina above and to the temporal side, gradually blending with the normal retina in the neighborhood of the macula. The swelling was white at its thickest part just off the disc, and gradually diminished towards its periphery.

The vessels were hidden by the swelling of the retinal fibres, the veins being engorged and tortuous. Slightly above the macula, four small, parallel, radially disposed hemorrhages were seen.



Scotoma in Retino-Choroiditis Juxta-Papillaris.

An examination of the visual field revealed an absolute scotoma involving the area of the blind spot and extending over a portion of the nasal field. (Fig. 1). At the present time, it involves practically the whole nasal field, as shown by the accompanying diagram (Fig. 2).

In the course of the following week after he was first seen, vision was reduced in the affected eye to 5/21, probably in part due to fine vitreous opacities which appeared about this time.

Treatment consisted in the use of hot compresses locally, and 1% atropine solution. Sweating by means of hot packs given daily, followed by innunctions of mercurial ointment to the point of salivation, and later the administration of potassium iodide. By these measures, the inflammatory condition began to improve, as did his vision.

As I have already said, the scotoma in the visual field extended gradually until at present it involves practically the entire nasal quadrant. This I believe is due to degeneration of the nerve fibres involved in the inflammatory focus.

At the present time he shows an area of degeneration near the disc, up and out, with some pigment heaping, involving an area about half the size of the disc, although there has been but little choroidal absorption in comparison to what I expected would occur. The disc edges are now fairly distinct. The vitreous opacities have disappeared, and his visual acuity is 5/6 without correction. This is improved to 5/5 with his correction.

At the time of his first examination, the ophthalmoscopic picture led me to suspect a neuro-retinitis, in which case the prognosis as to useful central vision should be guarded. On the other hand, an exudative choroiditis in juxtaposition to the nerve-head, with secondary swelling of the nerve-head, offers a much more favorable prognosis.

The visual field is of prime importance in deciding this point. The most important and most constant change in neuro-retinitis being a concentric contraction of the visual field, enlargement of the blind spot and formation of scotomata. Whereas, in localized choroiditis, the visual field will show a scotoma corresponding to the portion of the fundus involved, the course of the inflammation being relatively benign, and the loss of central vision practically *nil* unless the macula be involved in the process.

Jensen believed the loss in peripheral field to be due to a thrombosis of the arterial vessels in this area as a result of the exudate, and consequently the area supplied was deprived of perception.

Gross-Peterson, who reported a series of 15 cases, (Klin. Monatsbl. f. Augen., Aug., 1912. Abstract Ophthalmol., Apr., 1913) attributes the visual defect to a destruction of the nerve fibres produced by the inflammatory focus. This seems to me the most plausible explanation.

As to other causative factors of this condition, disease of the accessory nasal sinuses should be thought of. In this case, there was no evidence of such involvement and examination proved negative.

The possibility of a toxin giving rise to localized inflammation has been suggested, although not proven.

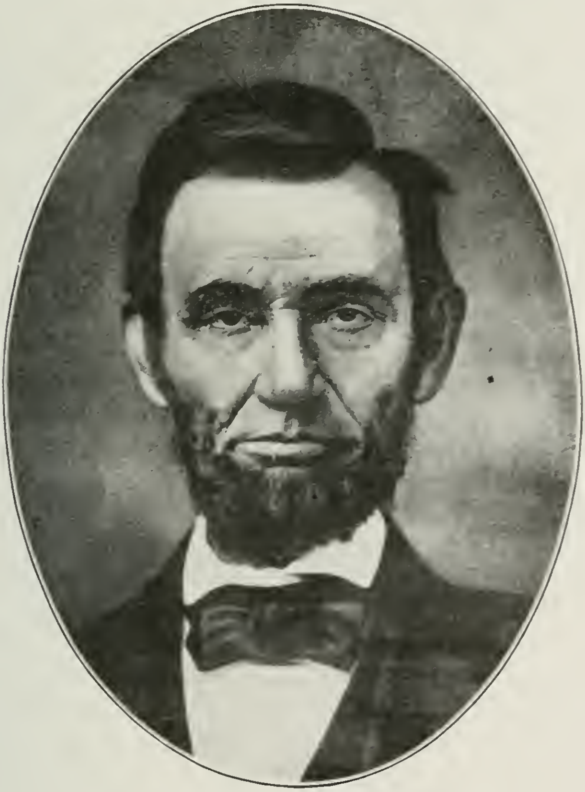
DIAGNOSIS OF HETEROPHORIA FROM A PORTRAIT.

BY S. MITCHELL, M. D., HORNELL, N. Y.

The fact that heterophoria and uncorrected errors of refraction are productive of numerous and varied and apparently mysterious nervous manifestations in the human economy, is in the light of present-day discoveries, acknowledged not only by the entire medical profession, but by the educated and thoughtful laity as well. The pathway of the medical profession in its upward climb to the high plane that it now occupies is marked all along the way by the products of brilliant minds, suggesting and working out many interesting and ingenious theories regarding the influence of refractive errors and heterophoria in the production of neurosis and neurotic symptoms. While some of these theories may appear to be far-fetched and almost absurd, nevertheless each one has had in them "food for thought," and I venture to assert that no member of the medical profession has been seriously crippled intellectually by thinking on these things.

I was prompted to write this article by having my attention drawn to a portrait of Lincoln during the recent anniversary celebration of the birth of this illustrious American. While I was examining a fine life-sized portrait, evidently a reproduction from a front-view photograph, I became aware of an effort that I was making to look Mr. Lincoln "straight in the eye," when to my amazement, I saw that the gaze was returned by the right eye of the portrait only, while the left eye was directed upward eight or ten degrees. Thinking that the left hyperphoria might be shown in this particular portrait only, I hastened to examine all the portraits that I could find, and discovered that the eyes in all of them presented the same picture of left hyperphoria. I was then forced to conclude that the fault must have existed in the eyes of the great man, and not made so to appear through the fault of any artist. It is fair to presume that the six or eight degrees of left hyperphoria may have been caused by an uncorrected refractive error and the use of the eye, as history informs us that Mr. Lincoln used his eyes, in his early efforts to acquire an education as he pored over his books at night with no better illumination than the flickering uncertain flames of a pine knot fire.

If the heterophoria can so operate upon the nervous system as to change the aptitude of the mind, possibly this small affection of the eyes, that I have had the audacity to diagnose as being present in the eyes of this great man, who died when I was but nine years of age, may have operated to change his life from a rude and reckless Mississippi boatman to the thoughtful, studious lawyer that he afterwards became. And thus laid the foundation for the future eminence, which is and always will remain, the admiration and inspiration of the civilized world.



Portrait of Abraham Lincoln showing Left Hyperphoria.

Chroniclers of the life of Lincoln all speak of the expression of ineffable sorrow frequently seen in his face. One of the most common symptoms observed in those who suffer from heterophoria is the corrugation of the brow and its resulting "crow-foot," which does so much to lend the human face an expression of sorrow. The heart-breaking burdens that the

Great Emancipator carried during the Civil War were undoubtedly the chief cause of his sorrowful countenance, but a hyperphoria of several degrees would lend its mite to make the marks of sorrow more eloquent and apparent.

I do not claim to be the first one to discover this great man's only fault, but simply wish to chronicle a matter that accidentally came to my notice, and thereby hear from other ophthalmologists who may have preceded me, but not written about it, in diagnosing Lincoln's heterophoria from his portrait.

In the accompanying photograph the left hyperphoria is plainly seen. In many of the portraits that I have examined the corrugation of the brow, forming a well-defined "crow-foot," was much more discernable than in this picture. Undoubtedly many of these wrinkles were removed by the artists in carefully retouching the negative used to produce the photograph here shown.

PSEUDO-OPTIC NEURITIS.

BY F. PHINIZY CALHOUN, A. B., M. D., ATLANTA, GA.

There is hardly an ophthalmologist of any experience who has not seen cases in which a decided haziness or blurring or even a swelling of the optic disc made him first consider the picture a pathological condition, which later upon observation proved to be a pseudo-neuritis. These cases are referred to the ophthalmologist or seek his advice on account of some ocular discomfort or headaches, and at times, it is difficult, if not impossible, to give an immediate opinion or even an interpretation of the fundus condition found.

The most common of these pictures is that seen in high degrees of hypermetropia, and here one may venture an opinion if sought, but in the emmetropic or myopic eye with this same picture without concomitant symptoms, an expression is at times most difficult.

A very excellent article with a short resume of the literature on the subject appears in The Ophthalmoscope of September of this year, by Russ Wood, and the reading of it recalled to my mind a most unusual case which was a puzzle for many months. The history is as follows:

Mrs. P., an elegant and refined Jewish woman, age 43, mother of three healthy children, was referred by her family physician on account of headaches. His examinations were negative and there had been no cause for the headaches. There was nothing unusual in the family history at this time which would give any light in assigning a cause for the patient's complaints. The patient complained of a heavy feeling in the eye lids and a tired sensation in the eyes, all of which were aggravated when using the eyes for close work. She had worn glasses for close work for three years. Vision, right 20/20, left 20/20 unimproved; under homatropine, R.+.50S=20/20, L.+.75 C. 180°=20/20. The following bifocals were subsequently given R+.25S.L+.75×180° add +1.25S. There was an exophoria 5° distance and near, which subsequently disappeared even with her accommodation and convergence aided. The fundus picture was most interesting and I was certain that I was dealing with a true case of optic neuritis. The margins of the disc were blurred and obliterated by a slight swelling. The vessels were normal in size and placement except the temporal veins of the right eye which were slightly full, and as the vessels approached the disc, they were lost or covered in the slight swelling and striations of retinal tissue. The fields were normal for form, but the colors in the right eye merged at 20° in all radiations, whereas in the left eye they approached the 40° mark in the temporal, horizontal direction. These fields were assumed to be accurate as they were found to be the same after several daily examinations.

A Wassermann proved to be negative, as was a complete urinalysis. I prescribed mixed treatment, restricted diet and a rest for the eyes.

The case was constantly under observation for seven months, without any material benefit, although the headaches at no time were severe enough for her to neglect her social and home duties. The change in the optic nerve remained the same and she had reached the maximum dose of 40 grs. of K. I. with 1/8 gr. of protiodide when it was discontinued.

A sister of the patient had just returned from a visit to her parents in Germany and while there she consulted a prominent professor of ophthalmology on account of her headaches. We were very much surprised to learn that her case had also puzzled this distinguished surgeon and I was told that he had arrived at the conclusion that the fundus picture which he saw was a congenital abnormality.

I requested that I might be allowed to make an examination which was readily granted. I found compound myopic astigmatism which with the proper correction gave normal vision. Fundus, right, picture of physiological cupping; left, one vessel bends at the disc. Margins of both discs decidedly blurred similar to her sister's. Fields—some slight contraction of the right. Tonometer— R 30 m.m. Hg. L 25 m.m. Hg. I have made frequent examination for over two years and find no change in the fields or fundus picture. The tonometer has shown some variations and registers from 24 to 31 m.m. Hg. at different times. While at first the case was suspicious of glaucoma on account of slight elevations of tension and the peculiar cupping of some of the vessels, I am now rather inclined to believe that the eye is normal.

Referring to the history of the case under consideration, I have very recently seen her, two years after her first visit, and no changes exist except the fields are somewhat smaller for form, but *normal* for color. She is passing through her menopause and feels remarkably well and is free from headaches, using glasses only for reading.

I am still of the opinion that the eye changes are not pathological and belong to the classification of pseudo-neuritis.

In considering the supposed congenital or anomalous condition of the optic nerve, we find many classifications made as in the inflammatory type, but the simplest form is that suggested by Wood, viz., pseudo-neuritis without swelling and pseudo-papillo-edema with swelling. The former type is often seen in hypermetropia. In an analysis of the reported cases, one finds nothing at all characteristic, except headaches, which are usually relieved by glasses, and the refractive state may be emmetropic or ametropic. There is never a concomitant change as seen in true neuritis, such as exudates, hemorrhages or even diminished vision.

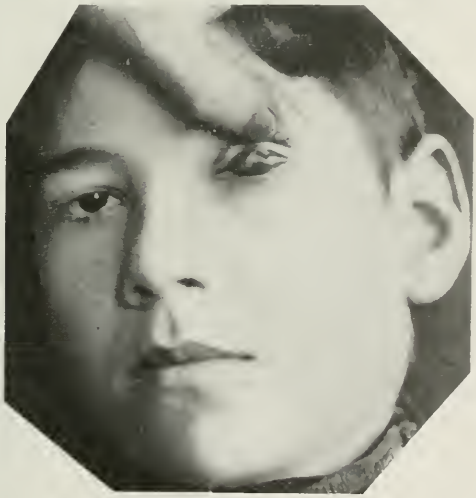
Unfortunately no eye has been examined in sections which had previously been examined ophthalmoscopically. It is thought that the blurring in a pseudo-neuritis, especially in hypermetropic forms, is due to the crowding together of the retina in a small eye. This does not explain the picture in the emmetropic or myopic eye, and it has often occurred to me that the presence of medullary nerve fibers slightly pigmented would be a correct interpretation of the anomaly. This pseudo-neuritis has often been observed in negroes which would add additional argument to this theory.

Of pseudo-papillo-edema we are not especially concerned in this short report, but it is supposed to be a more or less chronic edema of the nerve head for some unexplainable cause which does not affect the sight.

PARINAUD'S CONJUNCTIVITIS.

BY NORMAN W. PRICE, B. S., M. D., NIAGARA FALLS, N. Y.

C. N. is a boy twelve years of age, American born, having Canadian born parents. There is no history of tuberculosis or syphilis. He has never been sick to require the aid of a physician except for "Grippe." He apparently is healthy and robust in every way, with the exception of his eye.



Parinaud's Conjunctivitis Showing Large Lymph Masses and Swollen Retro-Maxillary Gland.

He came under my care on July 11th, 1913, with this glandular swelling in his neck much larger than is shown in picture which was taken Dec. 20th, 1913, when the eye and swelling in the neck had much improved. At first the eye discharge was quite profuse, muco-purulent in character, but a month later there was practically no discharge. A small micrococcus was the only germ found in the discharge, using Loeffler's methylene blue stain.

As the picture shows, the granulation or lymph follicles on the conjunctiva are very large and one over center even pedunculated, while the retro-maxillary gland in the neck on the same side is much swollen. There has been a white yellowish membrane over the granulations on the left side of the tarsus all the time. The right eye has not been affected.

The large mass I removed two months ago since which I think the eye has improved more rapidly. Have used a 2% solution of silver nitrate once a week with a simple collyria of bichlor. of mercury (1-10,000) and a saturated boric acid solution every day. During the period of discharge I used three times daily a mixture of the following:

$AgNO^3$ grs. 1½
Argyrol grs. xx
Aqua Dist. ½ Oz.

The eye is not yet well now Jan. 9, 1914. The affection started about June 1st, 1913.

LIGHT.

BY H. E. GOETZ, M. D., KNOXVILLE, TENN.

Man and his visual organs have from time to time adapted themselves to their surrounding conditions. The visual organ was made to accommodate, in primitive man, the natural illuminations, the sun and moon, and the result of combustion of the earth's materials, such as wood, coal, and the various oils and gases, and none of these illuminations, when properly used, are harmful to the eye of man.

The study of the solar spectrum has developed the fact that the different colors therein are so blended that its light is the ideal illumination. Therefore daylight, to the normal eye, is the proper light. There are some conditions under which sunlight is harmful to the human eye, of which I shall later speak.

Light, or, what is a better term, visible radiations, or radiant energy, has been found to possess definite wave length. These waves are measured by a unit having a value of 1/100 part of a centimeter, and are defined as Angstrom units. Of the visible radiations of the solar spectrum, we have a range of about 3600 Angstrom units. Waves of less than 3200 Angstrom units in length cannot enter the eye, the shortest visible ray being violet, at about 3200 units in length, and the longest being the red rays, about 7500 units in length.

Light, when absorbed, becomes heat, and heat, we know if applied in sufficient concentration to even the most substantial tissues of the body, has a destructive action thereon, and the delicate nature of the visual organs, especially the lens of the eye, makes it easily influenced by the wrong kind of energy, or wrong light. It is a developed fact that the solar spectrum contains more energy that is invisible to the eye than that which is visible. None of the ultra rays is capable of exciting vision, they being beyond the range of vision.

Ultra-violet rays, the rays possessing the greatest actinic action, are capable of being refracted and entering the eye only in part. Those shorter than 3200 Angstrom units are capable of doing damage to the outer structure of the eye. The longer ultra-violet rays penetrate the eye as far as the lens, and are there largely absorbed, and by their fluorescent action on the lens, dim vision, and a certain per cent of the same stimulate the rods of the retina and cause a nervous phenomenon to follow. The chemical action of these rays is capable of doin irreparable damage to the eye when this organ is exposed to them directly and in sufficient concentration for a long period of time.

The destructive action of these unseen rays is seen in practice in the patient after six to twenty-four hours exposure to the rays, and manifest themselves by deep-seated ocular pains, frontal headaches, inability to focus clearly at any point, the object at which fixation is made appearing to have a cloud or haze over it, to the extent that it is not well defined. Insomnia is a frequent symptom. These symptoms recur each time the eyes are used. Blurring of print, and the characteristic running together of letters seen in errors of refraction, are met with in the vast majority of these cases, thus making the situation, in so far as diagnosis is concerned, more complex, and one in which the use of the retinoscope alone will differentiate from light burns. These cases respond slowly to treatment. Usually the patient goes from one oculist to another searching for relief, which he does not find promptly. Some recover in a year when proper treatment is promptly instituted. Others never recover, depending upon the severity of the injury to the eye.

Every observing oculist has, at some time in his practice, found a case or a number of cases where, be he ever so skilled a refractionist, he was unable to give the patient more than half or three-fourths normal vision, or to relieve with glasses the symptoms of asthenopia which the patient presented, and yet no lesion in any of the refractive media was traceable to which the poor vision could be assigned. A close objective and subjective examination of this patient would doubtless develop the fact that the patient at some time had so-called eye-strain under artificial illumination, or direct or reflected strong rays from the sun or some other powerful luminous body. The most common source of trouble from these ultra-violet rays is the mercury vapor lamp, open arc lamps, spark from wireless apparatus, coke flames, such as the moulder is subjected to, and light reflected from glossy blue surfaces like a high gloss over a blue paint, from which light is reflected.

There are other forms of eye-strain, that come on as the result of improper illumination, such as is produced by an uneven flame, namely, an open gas jet affected by air currents, commonly called "fluttering," incandescent lights on a current which is frequently underloaded and overloaded to the extent of interfering with the volume of the light, or lights of different volume allowed to penetrate the same space, such as a more powerful stream of light passing into a room which is illuminated by a less powerful light. These conditions so tax the iris and other structures of the eye as to greatly fatigue, if nothing more. Constant repetition of this brings on asthenopia in its worst form. I frequently see nervous phenomena arising from these causes which baffled all remedial measures until the causes were removed.

Reflection of light is a condition with which all are familiar, and no doubt suffered. One of the most harmful sources is the sun's rays reflected from a body of water or from snow, or any other highly reflectible surface. Snow blindness, and blindness caused from the subjection of the eye to sunlight reflected from water or a mirror, do not differ in their symptoms. Recovery from a single attack is usually prompt and complete, but when repeated, the prognosis is not so good.

It has been observed that in countries of the far North, Labrador, Siberia, Alaska, and Norway, that the per cent of cataracts seen in people is greater than that in the temperate zones, and cataracts are found in persons at an earlier age than commonly seen further south.

I have referred to the well known phenomenon of the ab sorption of light changing form to heat. Further, I said that the lens of the eye is known to absorb ultra-violet rays from the light that passes into the eye, and thus heat energy is brought about in the lens, which tends to harden this body and causes it to become opaque, just as the skin takes on a coat of pigment when subjected to the rays of the sun. It has been found that moulders frequently have cataracts in immature age.

I have above referred to the coke flames containing an excess of ultra-violet rays. It is not uncommon to find presbyopia at an immature period in the people of today, and I believe this too to be due to the chemical effect of artificial illumination.

In addition to the snow blindness of which I have spoken, there is also a glare blindness caused by the reflection of rays of light from any body capable of reflecting light into the eyes, which is commonly seen in patients who have been reading for a long period of time, print on glazed paper, or walking on a sunny day on cement sidewalks. This is simply a case of retinal fatigue, or, in other words, the retinal purple is not furnished fast enough to combat the demands made upon it. The constant repetition brings about retinal changes in the cones, and makes a permanent diminution of vision.

Eclipse blindness is a common condition which is alike. in both symptoms and pathology, to snow and glare blindness. This condition, as the name suggests, is brought on by subjecting the eye to the direct rays of the sun during an eclipse.

Recent study has developed evidence to the satisfaction of the minds of the investigators that the psychologic influence of light is great on the human being. I recently visited the Bureau of Printing & Engraving at Washington, where the building is illuminated with mercury vapor light. I inquired of a number of the employees there as to the effect of the light upon them. One man answered that he did not pay any attention to the light—it seemed to be good enough light. Each of four women expressed their dislike for the light, but could not say why, except that "It made them look like they were dead." Certainly, it is not good light, and investigations would doubtless develop the harmfulness of the rays there, as in other places. Ultra-violet rays are harmful to the human eye in the main, because of their absorption by the lens, and in which it is believed they produce cataract and premature presbyopia. They undoubtedly cause external injuries to the eyes, accompanied by deep-seated ocular pains, which tend to persist. All artificial light is far more harmful to the eyes than daylight since they all contain an abundance of invisible energy and produce power burns and a train of symptoms usually seen in asthenopia.

It is a fact in practice that the patient who most frequently calls upon the oculist for relief is he or she who is constantly subjecting the eyes to artificial illumination. Strong illuminations coming in contact with the eye are to be avoided at all times, regardless of from what source they come. Experience has taught us that all are harmful, whether or not they are ultra-violet, or ultra-something else. Flickering or streaked lights affect the eyes and produce nervousness. Persons engaging in occupations subjecting them to these harmful agencies should be warned against them, and every precaution should be taken to preserve our visual organs for the sake of coming generations. The spectra of the different lights now commonly used should be taken, and proper means should be instituted by municipalities to prevent the harmful ones. The placing of any crown glass lens in front of the human eye will, in the main, turn away the ultra-violet rays, and all persons where harmful illumination is used should be warned, and compelled to take precautions against the use of such light until the source of illumination can be changed. Prevention is by far the best treatment. The various tinted lenses, such as amber and the like, are good, in that they will not pass rays of other color than their own.

When it becomes necessary to attempt to restore the normal condition rather than prevent, the patient should be confined to a dark room, with a cold pack over the eyes as a palliative measure. Relief of the pain, and aid in the elimination of toxins which are doubtless produced in the interior of the eye-ball on account of these destructive rays, is best accomplished by a five to eight per cent solution of dionin, frequently applied. This, I have found, brings prompt and certain relief so far as pain is concerned. The return to the normal, as stated above, may be slow. The dionin can be continued indefinitely with good results.

"CASTOR OIL AS A MENSTRUUM FOR COCAINE."

BY S. MITCHELL, JR., M. D., HORNELL, N. Y.

In the New York Medical Record for May 3, 1889, there was published under the above title the following article:

"The use of cocaine dissolved in castor-oil may not be to many such a novel method of employing this valuable agent as it was to me. I do not remember, however, to have heard of its previous use, and the idea only occurred to me in the dire extremity when seemingly I had exhausted all the remedies that were at all applicable, and my patient was "nothing better."

"I trust the publication of the following details of the case wherein I first employed the above remedy, may be of interest and perhaps profit to others.

"Mr. H——, aged fifty, whom I was treating for chronic aural catarrh, was suddenly attacked with herpes zoster, covering the whole left side of the head from the temporal ridge to the occiput. Nearly the first vesicle to form was in the conjunctiva of the upper lid of the left eye. It was attended with much pain, great congestion of the whole palpebral and ocular conjunctiva, contraction of the pupil, and sluggishness of the iris. Atropine and cocaine were employed during the whole course of the disease, and the eye thus kept quite comfortable until the disappearance of the vesicles from the head. As they healed, leaving deep and painful cicatrices, the one in the conjunctiva healed also, leaving a hard cicatrix that at once assisted in forming an ulcer in the lower margin of the cornea, as large as a kernel of wheat, that steadily grew deeper and more painful, despite all remedies employed. At the end of a week there was well-marked chemosis, together with deep-seated and constant pain. At this juncture it occurred to me to try a drop of castor-oil in the eye, if possible by its use to mitigate the terrible rasping the hard cicatrix was inflicting upon the cornea: then the happy idea suggested itself to combine cocaine with the oil. A five per cent solution was made, dissolving the cocaine in the oil by means of gentle heat. A few drops of this were instilled into the eye, with almost magical effect.

"Pain was at once greatly mitigated, the chemosis disappeared, the cornea cleared up, the ulcer began to heal, and my patient grew happy and smiling. All other remedies were discontinued, recovery being rapid and complete."

Since the above was written I have occasionally prescribed cocaine dissolved in castor-oil as an emollient in painful diseases of the cornea, and from the writings of other ophthalmologists, know that its use in this form has become more or less common.

SOAP AND WATER AND OPTICIANS.*

CHARLES H. MAY, M. D., NEW YORK.

The brief remarks which I desire to make, which might be referred to as a "note" rather than a "paper," are intended to call attention to the fact that opticians are lax regarding the cleanliness of their hands. A certain number of patients have complained and felt uncomfortable on account of the dirty condition of the hands of some opticians, and have asked whether it were not possible to convey infection through the fingers in the fitting and adjusting of spectacles and eyeglasses.

Though the transmission of conjunctival disease by infection in this manner is probably not of frequent occurrence, it must be admitted that it is easily possible; one can readily imagine a route of infection from the eye of one patient to his lenses, to the fingers of the optician, and thence to the frames, lenses and eyes of a second individual.

Investigation showed that in none of the principal optical establishments of this city were any precautions taken to prevent infection of this sort; there were no facilities for washing the hands in the store proper; wash basins existed only in the basement or cellar. Under such circumstances it was natural to suppose that the optician rarely washed his hands during his work and perhaps never did so in the course of the day.

It is not my desire to accuse the opticians in general of uncleanliness; on the contrary, I think many of them are neat and clean individuals. I believe that the absence of wash basins in their establishments is due to the fact that such a necessity was not thought of.

It is certainly not too much to ask that, in the interest of general cleanliness and the prevention of any possible danger of infection, a wash basin with running water and liquid soap, and a supply of towels to be used once only, be part of the equipment of the store, in plain view of the customer, and that an optician be expected to wash his hands as soon as he has finished fitting a patient, before he commences similar work upon another. Such fixtures are furnished in an attractive form, especially when made of glass and nickel, do not occupy much space and rather add to than detract from the general good appearance of an establishment.

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*Read at the Feb. 16, 1914 meeting of the Ophthalmological Section of the New York Academy of Medicine.

Incidentally I would say that the towel or piece of chamois which does continuous or lengthy duty for wiping lenses ought to be discarded and in its place a separate piece of gauze or bibulous paper such as is found in the form of paper napkins be used for each pair of glasses and then discarded. Many opticians now employ such materials for wiping lenses.

Though I have mentioned the desirability of installing wash basins close to the fitting table to quite a number of opticians, the suggestion has not been acted upon as yet except in two instances. My object in calling attention to this defect in many otherwise well-equipped optical establishments is to enlist the interest of ophthalmologists in general in the demand for this reform; if the attention of opticians were persistently called to its desirability there is little probability that the present absence of such aids to cleanliness would continue.

ALBINISM OF THE EYES WITHOUT INVOLVEMENT OF THE HAIR OR SKIN.

BY WM. E. GAMBLE, M. D., CHICAGO.

Master A., 27 months old; first came under observation when 8 months old. Mother stated he could not see like other children of that age; that he was blind.

In addition to the lateral nystagmus, it was readily seen that the eyes were albinotic. There was evidently some pigment in the irides as a suggestion of color in both was present.

To my surprise there were no evidences of albinism in other parts of the body. The skin was normally pigmented and the hair was light brown. The child has been under observation up to the present time, and, as commonly seen in young children, the hair has grown darker, now dark brown, and it is my opinion that the irides are also darker.

At about 16 months of age, his hypermetropia was corrected, the lenses being ground out of London smoked glass, No. 3.

With his glasses on, he now plays with other children and with small objects.

Albinism of the eye alone is a very rare deformity, however, a few cases have been reported, (1) Lawford, Nettleship and Stephenson have observed similar cases, also cases involving hair and skin without involving eyes.

Among some peoples, as the Frisians and in some sections of Norway and England, some families have white hair and skin and very light blue irides, however, combined with good sight, nystagmus and other functional disorders not present. Such cases cannot be albinotic; so that the means of differentiating between very light complexions and albinism rests upon disturbances in the function of the eye, as shown by reduction in sight, nystagmus, etc.

The reduction in sight in these cases is due to several factors. Errors of refraction are commonly present, the eyeball may be either too short or too long. The optical correction of this deformity, while it helps some, shows that these are of secondary importance and that the real cause lies in the want of pigment in the retina and the uveal tract.

We have all seen nystagmus develop in a child, from opacity of the cornea, while opacity of the cornea in an adult does not produce it. It is no doubt true that in these albinoes this nystagmus points to the fact that they have had imperfect vision from the start. There necessarily must be imperfection of the image on the retina, as there would be on the photographic plate or film if the camera leaked light.

As to the prognosis in the cases of young children, there are observations which indicate that the pigmentation of the eye is increased with age. Such cases have been noted by Ascherson, Myer, Usher and Abadie.

In the Ascherson case, in a child with white hair and violet colored eyes and dark red pupils, at the end of the third year the hair became light brown and the eyes light blue, and vision improved. Abadie reported a case of two albinotic siblings quite blind at nine months of age, then gradually evidence of sight appeared and at nine years their acuity of vision was 1/10.

Pearson, Nettlesip and Usher, in their monumental monograph on the subject, had a case under observation of incomplete albinism in which the visual acuity was 6/60 at the age of 6 years. The vision increased to 6/18 when he was 8 years of age and at 18 he had 6/12, nystagmus still being present; so that in the young in cases of partial albinism of the eye, the prospect is favorable for improvement in sight with proper treatment.

Regarding the treatment, it goes without saying that errors of refraction should be corrected, the lenses being ground from smoked glass in order that the clearest image may be placed upon the retina, and the child should wear the colored lenses at the earliest possible age in order that fullest development of the cerebro-visual apparatus by proper stimulation during the developmental period may take place. In the monograph mentioned above, there is mentioned a very intelligent patient getting the most comfort and best vision by wearing a blackened metal shield, closely fitting, with a minute hole or slit opposite the pupil.

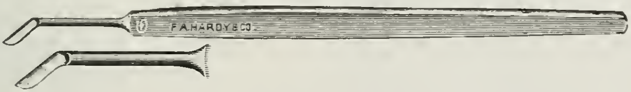
Attempts at introducing coloring matter under the conjunctiva, so far, have been unsatisfactory.

Note 1.—All references to previously reported cases in this paper have been taken from Pearson, Nettleship & Usher's monograph on Albinism.

A KERATOME, WHICH FACILITATES THE ELLIOT TREPHINING OPERATION.*

BY G. B. JOBSON, M. D., FRANKLIN, PA.

In the performance of the Elliot operation for glaucoma, dissection of the flap into the cornea, is quickly and safely done by the use of a keratome, which I devised for keratotomy* in 1912. The flap is made as follows: The conjunctiva is grasped in a vertical fold, with a pair of toothed forceps, as far above the cornea as possible. The fold of conjunctiva is snipped transversely with a pair of slightly curved Steven's tenotomy scissors. One blade of the scissors is entered in the cut, and the incision is continued downward, first on one side of the cornea, and then on the opposite side, to bisect the ends of an imaginary line 2 millimeters below the upper sclerocorneal junction. The apex of the flap is grasped with forceps, and the conjunctiva separated to the limbus with the points



Keratome for Splitting Cornea in Sclero-Corneal Trephining.

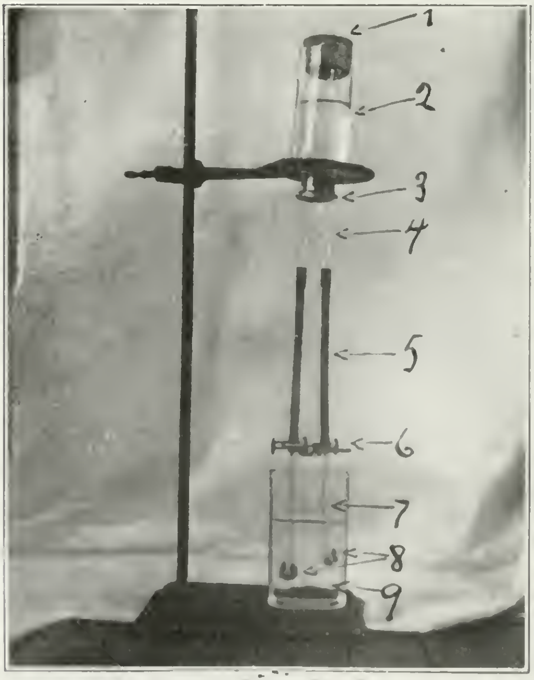
of the scissors, which are turned toward the sclera, to prevent the buttonholing the flap. This flap is turned over the cornea, and dissected with the keratome down to the corneal margin, and the epithelial and outer corneal layers are undermined for about 2 millimeters, being careful not to enter the anterior chamber. This affords sufficient space for the entrance of the trephine, half in the cornea, and half in the limbus. The Beebe binocular loupe is of assistance in making the corneal part of the flap, and trephining; as it magnifies the field considerably.

*The Ophthalmic Record, July, 1912.

A NEW METHOD OF PREPARING AN EYE FOR MICROSCOPIC SECTIONS.

BY HAL R. WRIGHT, M. D., COLUMBUS, O.

The following is a description of the fixation apparatus by which intra-ocular pressure is maintained and the tissues fixed in their normal positions, thereby preventing detachment of the retina and shriveling and wrinkling of the cornea.



Apparatus for Fixing Eye Tissues

1. Perforated cork to limit evaporation.
2. Reservoir for fixation fluid.
3 & 4. Perforated cork and Y tube, all well paraffined to prevent leakage.
5. Rubber tubings.
6. Pinch cocks to prevent fixing fluid from running out while eye is being adjusted or removed from pipette.
7. Glass pipette, resembling medicine dropper.
8. Eyes as they appear when in position.
9. Jar containing fixing fluid, same as in reservoid above.

Method of Application.

1st. The eye should be as fresh as possible.

2nd. See that the reservoir is filled with fixing fluid to be used.

3d. Open pinch cock and drive all air from pipettes.

4th. Plunge Graefe knife into vitreous chamber four or five mm. posterior to sclero-corneal border.

5th. Insert pipette into this opening, seeing that it fits tightly enough to support the eye while the pinch cock is open.

6th. Let pinch cock close on upper end of pipette.

7th. Suspend the eye in a jar or bottle containing same fixing agent as in reservoir above, which allow to remain as long as desired.

This apparatus is used only to fix; after this the eye is removed, washed in running water for twelve hours, dehydrated, and infiltrated in the usual manner, excepting that during the infiltration the eye should remain in the thin and thick celloidin each, from ten to twenty days. I find that by doing this that the lens, sclera and cornea cut and hold together better than by the old method.

A commission for the Conservation of Vision and the Prevention of Blindness, composed of the following ophthalmologists, has been appointed in the state of Oregon: Dr. Joseph L. McCool, Portland, Chairman; Drs. John F. Dickson, Portland; Wm. M. Pearce, Baker; Wm. L. Wood, Portland; J. J. Emmons, Medford; F. B. Eaton, Portland; J. M. Waugh, Hood River; Geo. Ainslee, Portland; and Ralph A. Fenton, Portland.

This commission is empowered to appoint an advisory commission which shall consist of an educator, an architect, a railroad official, a representative of the press, a lumberman, an illuminating engineer, a banker, a merchant and the Superintendent of the School for the Blind.

The chairman of the commission is also the Manager of the Oregon Bureau for the Conservation of Vision of the American Medical Association, and it is the intention of the commission to cooperate with this Bureau in furthering this very important movement.

REPORT OF A CASE OF GLIOMA OF THE RETINA IN A CHILD EIGHT MONTHS OLD.

BY BENJAMIN GLEESON, M. D., DANVILLE, ILLINOIS.

The following case is of especial interest owing to the fact of the tumor itself being comparatively rare, and especially so in a child of this age.

Baby P. Age 8 months was referred to me by her family physician, Dr. Roberts, on March 9th, with a statement that for 4 months past, the parents had noticed the pupil of the left eye seemed lighter in color than the opposite one, and for past month thought the left eyeball seemed slightly larger than the right. External examination revealed the eyeball to be somewhat larger than the opposite one, the enlargment showing principally in the diameter of the cornea. Pupil slightly dilated, and immobile. Tension normal or plus one. Oblique examination showed situated about 4 millimeters back of the lens, a yellowish white nodular tumor, traversed by a few small blood vessels. When viewed with the ophthalmoscope the growth seemed more nodular, and blood vessels more numerous, and to occupy the whole vitreous space. Fundus view not obtainable.

A diagnosis of Glioma of the retina, was made, and an enucleation advised, which was performed two days afterward, under ether narcosis; I was particularly fortunate in severing the optic nerve ⅝ of an inch back from its ocular entrance, and the patient made an uneventful recovery, leaving the hospital on the 5th day. The eyeball was sent to a pathologist, who made the following report:

Tumor—"Glioepithelioma. This name has been given to the condition by Wintersteiner, but obviously is a misnomer as there is no epithelial structure in this region. Suffice it to say that it is a malignant growth of the retina in which the various elements of the retina can be differentiated by special stains. It is inclined to grow by direct extension, and rapidly degenerates as the blood supply is outgrown.

Optic Nerve—Normal in all parts obtained with the eye. No signs of metastasis or extension."

My conclusion from the report is, that we have here a Glioma of the retina, which is probably congenital, and from such an early complete operation, may we not hope for a permanent cure?

REPORTS OF SOCIETIES

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of Monday, November 3, 1913.

DR. S. LEWIS ZIEGLER, CHAIRMAN.

Vertical Diplopia Following the Killian Operation.

Dr. J. Norman Risley presented a patient who had been one of three illustrative cases of diplopia following the Killian operation which formed the subject of a paper read before the Philadelphia Laryngological Society by Dr. Skillern at its December, 1912, meeting.

The patient first applied for relief to Dr. Risley in August, 1912, for a vertical diplopia which incapacitated her from all lucrative occupation. The diplopia had appeared immediately following the first removal of the bandage following a Killian operation performed by Dr. Skillern, July 23, 1912.

At no time had there been any real relief from the double vision, and the amount of deviation was steadily increasing. When first seen, after correcting a simple hypermetropic astigmatism, there was a left hyperphoria of 8° and an esophoria of 3°. This was corrected by suitable prisms, but under frequent observation, the hyperphoria steadily increased until in October, 1913, 20½° was demonstrated for infinity by ruby light and maddox rod, but no lateral deviation.

The patient, however, had never been able to return to her work as a loom operator even with the prismatic correction owing to distortion of images and fear of injury. It was suggested that a tenotomy of the left superior rectus might possibly be beneficial and this was performed on October 2 1913, when a free tenotomy of the left superior rectus was made. The eyes were kept bandaged for more than a week without measurement of any sort being taken in order not to interfere with firm reattachment of the tendon in its new position. At the end of that time, rod and light showed absolute orthophoria, which was continued to date, November 3, 1913.

DISCUSSION. Dr. Zentmayer recalled having seen a case of paralysis of the superior oblique probably due to detachment of the pulley by a penetrating orbital wound. It had been impressed on his memory because the correct diagnosis had been made by the country doctor who had referred the case to the clinic. His recollection was that Dr. Norris entirely relieved the diplopia by cutting the inferior rectus of the opposite eye.

Case of Melanosarcoma.

Dr. Berens reported the following case: Mrs. Anna Trout, aged 48, Coatesville, Pa., was assigned to my service at Wills Hospital on October 11, 1913. The patient declared herself as "never being ill," and her appearance certainly confirmed her words—but protruding from between the eye-lids of the left side was a mass of black and foul tissue 2¾ inches horizontal diameter, 1¾ inches vertical diameter and extended two inches beyond the eye-lids. The mass moved concomitantly with the sound eye and seemed pedunculated. There was a history of injury to the eye fifteen years ago. The pedicle was strangulated by a stout silk suture and severed with scissors. The lids and orbital tissues were found unaffected and the posterior half of the globe was removed without difficulty. Healing was prompt. Microscopically, absolutely no involvement of the inner layers of the globe were found. The iris, lens and ciliary bodies were seemingly free from disease, and the mass seemed to have grown entirely from the cornea and was not pedunculated.

Dr. Berens reported a case of congenital double upward dislocation of the lens.

DISCUSSION. Dr. Frank Fisher reported the following histories:

F. C. C., aet. 31, on June 3, 1907, appearance of eyes normal save slightly tremulous irides. R. E. lens dislocated up and in showing opaque edge crossing the pupil at about the lower third. Vision = 2/60. L. E. lens dislocated up and out, the opaque edge crossing the pupil at lower third. Vision = 2/60.

H. M. C., aet. 6, (son of F. C. C.), on September 21, 1910. Appearance of eyes was normal save for slight epicanthus. Irides not tremulous. R. E. lens dislocated up and in, the opaque lower border crossing the pupil at extreme lower edge. Vision = 5/60. L. E. lens dislocated up and out, the opaque lower border crossing pupil at extreme lower edge. Vision = 5/60. A history of the refraction of these cases may be interesting. The father had for years worn concave lenses, about -16, affording distant vision of 5/60, but no satisfactory vision for near objects. Under mydriasis the R. E. with +11.00+1.00 cy. ax. 120° yielded 6/9. The L. E. with +11.00 yielded 6/12. These lenses were ordered and mydriasis continued for some weeks. When mydriatic was discontinued the eyes had adjusted themselves to a position permitting vision below the dislocated crystalline lenses. Plus three was added for near work. Vision has remained the same up to this time.

In the son's case the vision had to be adjusted through the crystalline lenses. R. E. —2.00—2.00 cy. ax. 180° = 6/20; L. E. —1.50 cy. ax. 150° = 6/9, which vision is maintained till this time.

Dr. Schwenk stated that a dislocated lens is a foreign body in an eye and sooner or later it gives rise to glaucoma or iridocyclitis and should be removed before the eye is thus destroyed while there is still hope for useful vision. He reported two cases, brother and sister, each having lost one eye from glaucoma, but the remaining eye in each case was made useful by having had the lens removed. Discission in the young and lens extraction in adults should be done as soon as the patient will assent. Dr. Schwenk had had uniform good results in half a dozen or more cases.

Dr. Posey said that he had under his care at the present time a case of bilateral symmetrical upward and inward dislocation of both crystalline lenses. He was attempting to remove the lens of the right eye by discission. On account of the difficulty and danger often present in the removal of dislocated lenses, he thought operative procedure should only be undertaken when vision was greatly compromised in consequence of the faulty position of the lens. A point of considerable importance, to which attention is but seldom called, is the age at which operations upon the lens should be undertaken in children. All things being equal, Dr. Posey thought it desirable to delay operating until the child was at least three years old. The dressing of the wound is difficult in young infants, making the chance of infection greater. In cases of total cataract, he had operated as early as two or three months.

Delayed Formation of the Anterior Chamber after Cataract Operation.

Dr. Zentmayer presented two cases. Both patients were operated upon the same day, about six weeks ago. In one the chamber has been formed one week and in the other it is still absent. The first patient was a man 71 years of age in good health. The operation was without complication. There was marked striped keratitis from the beginning, this was followed by dense haze of the central and upper part of the cornea which has gradually cleared since the reformation of the chamber about one week ago. One week after the operation the lips of the wound were wiped and touched with a 20-grain solution of nitrate of silver. All bandages were removed and the lids kept closed with isinglass strips. There was no further interference. Vision today 6/15.

The second patient was a man 70 years of age, mentally and physically weak. The lens was removed with a vectis and some vitreous was lost. The anterior chamber was reformed after 48 hours but was empty 24 hours later and has remained so. The cornea is clear, the iris is against Descemet's membrane and is becoming atrophic. There has been marked ciliary congestion and the tension recently has been elevated. Vision equals hand movements. The treatment was precisely that of the first case. Dr. Zentmayer said that there are many causes for failure of the wound to close early, the most frequent being the presence between the lips of the wound of a shred of capsule or cortical; slow healing of the wound from either local or systemic conditions of impaired nutrition; uneven pressure from bad bandaging. He thought the explanation in the second case might be that the adhesion of the conjunctival flap had allowed the aqueous to reform and this explained the formation of the chamber at the end of 48 hours. That after that the vitreous came forward and occupied the space formerly making up the anterior and posterior chambers. This supposition is upheld by the fact that the T. is increased which would not be so if the wound were leaking.

DISCUSSION. Dr. Posey asked Dr. Zentmayer if he had thought that the shallowness of the chamber might be due to an escape of the vitreous into the suprachoroidal space, due to rents in the periphery of the iris, i. e., an example of the class of cases to which Fuchs has called attention. He could remember two such cases in his own practice. Dr. Posey thought the solution of rapid restoration of the anterior chamber after cataract operation resides in the acquisition of an ample, properly-placed conjunctival flap. Before he had become a convert to this method of extraction, he had had several cases of delayed union, in one, the flap showing no tendency to heal even six weeks after the extraction. In this case, union was finally accomplished by cauterizing the lips of the wound with the actual cautery.

Dr. Zentmayer said in reply to Dr. Posey that he had failed to consider this as a cause but thought that if that was the explanation the T. should be normal.

Sclero-corneal Trephining.

Dr. Schwenk showed a case of absolute glaucoma on which he had the senior house surgeon do an Elliot operation with the view of lessening the glaucomatous tension and pain. The case progressed nicely, but the tension not abating as he had anticipated he decided to remove a cataractous lens. The anterior chamber being very shallow the knife was passed through the lens in making the incision. After the incision was completed the lens popped out, somewhat embarrassing the operator. The eye was dressed within the limits of safety and bandage applied. Two days later patient was out of bed without a bandage and the eye looked as though it had not been operated upon. The anterior chamber was established, the wound united and the patient anxious to go home. Dr. Schwenk considered the Elliot operation useful in old glaucoma cases, but in acute cases he preferred iridectomy.

DISCUSSION. Dr. Posey said that he did not consider the trephining operation the simple procedure many claimed. It took but a cursory glance through recent articles of Elliot and Wallis to learn of its serious complications. Indeed it is surprising what a variety of happenings may attend the removal of such a small piece of sclera. Dr. Posey said the chief difficulty he had to contend with was to obtain a sufficiently sharp cutting edge on the trephines. He did not find it necessary to insert a stitch into the conjunctiva. One should get along with as little adrenalin as possible on account of the swelling of the conjunctiva which is entailed, thereby somewhat obscuring the limbus. He was still skeptical whether the results of trephining would be found to compare with those obtained from the proper use of miotics. Careful and detailed observation of groups of cases studied for a number of years after operation would alone decide.

Dr. McCluney Radcliffe spoke of his favorable experience with the Elliot operation and commended it as a safe, conservative and efficient operation. He prefers the von Hippel trephine as it cuts quickly and without undue pressure on the globe.

Dr. Burton Chance exhibited from Dr. Schwenk's clinic two cases, showing unusual opacities of the crystalline lenses, occurring in a man and a woman. The man had lost an arm by being crushed by heavy machinery. He came to the hospital because of a solder burn of the conjunctiva. The woman could not remember having received injuries nor could she otherwise ascribe any cause for her impaired vision. The man stated that he had been a sharp-shooter in the U. S. Army and had passed tests while in the service. The visual acuity of his left eye was normal; of the right only 6/60. Eccentrically in the posterior cortex was an almost exactly circular ring of opacity forming a dense line. Radiating about it as from the more superficial layers were fine striae made up of small dots. The anterior cortex contained fine striations also. The deeper media and fundus were healthy. In the woman's left eye the lens presented practically exactly similar characteristics. In the two cases the portions included by the rings contained no opacities; a clear reflex passing through them. The exact etiology of these cases is hard to state. Assuming that the man's lens was injured at the time of his accident, one might presume and believe that the woman's eye too had been injured by an accident, the knowledge of which had entirely passed from her recollection.

He presented also a case of bilateral congenital cataract in a colored girl of seven who had been referred to the city ophthalmologist by her school teacher with the belief that she had only weak sight and could be benefited by glasses. In each eye the lens was opaque to within about the outer sixth. The opacities consisted of large disks composed of converging clumps which, in no way resembled stars, as the base of the pyramids were peripheral. Between the slanting sides of the clumps the lenses were sufficiently transparent as to afford a visual acuity equal to 6/12. No satisfactory views of the fundi could be obtained, yet the choroids and retinas were believed to be healthy.

J. MILTON GRISCOM, M. D., *Secretary.*

ST. LOUIS MEDICAL SOCIETY, OPHTHALMIC SECTION.

Nov. 5, 1913.

Keratitis.

Dr. J. Gross: This man, 19 years old, came to the clinic at Washington University several days ago, November 1st. As you will see, he had a vascular keratitis of the right eye, which covers almost the entire cornea, excepting an oval area surrounding the center of the cornea. The entire cornea is vascularized so the iris cannot be seen and the central portion of the cornea appears grayish and hazy. I could not get a satisfactory history of lues from him: says he had a sore on his genitalia about a year ago and again three months ago. He does not give any history of secondary trouble and there are not any secondary manifestations. The right eye became sore about seven weeks ago. Four days later he went to the City Hospital and remained there ten days. While there he was given salvarsan. The eye did not improve and he left the hospital at the end of ten days. He then consulted an oculist and remained under his treatment five weeks, but he was not satisfied with his treatment. It seems that this oculist proposed enucleation and that is a matter which I would like you to consider tonight, as to whether or not there is any reason why there should be an enucleation. The tension is a little below normal. We have placed him on mixed treatment. Our diagnosis is luetic trouble, either acquired or congenital. I think it is quite an unusual case. We did not have a Wassermann made.

DISCUSSION. Dr. Woodruff: I would like to know if a tuberculin test has been made?

Dr. Green: Have there been any signs of sympathetic irritation?

Dr. Gross: No tuberculin test was made. I have not seen any signs of sympathetic irritation and I cannot see on what grounds the oculist proposed enucleation.

Dr. Shoemaker: Was there any ophthalmoscopic examination made of the good eye?

Dr. Gross: No. I was quite anxious to have the section see the case and did not have time to make on ophthalmoscopic examination, as the patient has so much photophobia.

Both Wassermann and Tuberculin tests, *made later*, were negative and examination of the fundus of the good eye showed nothing abnormal. Right Eye V. Perception of light. Left Eye V. 20/38.

Reports and Presentation of the Glaucoma Cases Operated on by Col. Elliot, of India.

Dr. W. A. Shoemaker: What is Col. Elliot's opinion regarding the indications and the contra-indications of his operation in simple chronic glaucoma and what results has he obtained?

Dr. Green: I believe I can answer Dr. Shoemaker's question. That question came up and was one of the principal points in the discussion at Chattanooga. Dr. Reber read a paper on "Trephining in Glaucoma" and incidentally he stated in regard to chronic glaucoma, that he would not perform any operation so long as vision and fields did not diminish and tension did not go above normal. This view, which, I presume, is shared by most American Surgeons, was strongly opposed by Col. Elliot. He compared chronic glaucoma to appendicitis; after one attack you are probably going to have another attack, in fact, you are always going to live in the expectation of repeated attacks. He believes that each case of chronic glaucoma ought to be operated as soon as the disease is definitely recognized.

Dr. Shahan: I saw a case of Dr. Ewing's in which an iridectomy had been accidentally performed in one eye, in the man's youth, many years before he came to the office.. In the other eye he had glaucoma simplex, which caused that eye to become blind. I have always believed that the traumatic iridectomy, in this case, acted as a prophylactic and prevented the onset of glaucoma.

Dr. Wiener: Col. Elliot also made the remark that he thought the trephining operation should always be made in both eyes. And if there were no symptoms, even in the other eye, that he always advised trephine operation in both eyes. First on the affected eye, because he considered that a prophylactic measure.

Dr. Ewing: In this connection, Col. Elliot remarked, that in India a large proportion of the cases showed only constriction in the visual field, cupping of the disk and visual failure, with very little elevation of the tension, yet he always resorted to the operation with favorable results.

Dr. Post: As we are quoting, I might also quote this as it possibly throws a little light upon the opinion of so high an authority as Col. Elliot. He says that his patients in Madras frequently came long distances. So when they came with suspicious conditions, and as very likely it was their only opportunity, he felt obliged to operate where he would not if the man were his next door neighbor and he could keep track of him. Of course, I take it that very few of us can feel that any operation is absolutely free from a certain amount of risk. I can say that Col. Elliot is very pronounced in his idea that if there is any suggestion of glaucoma, the eye should be trephined, and I think in his mind the glaucoma in one eye makes it probable that it will attack the other and that it may be best to operate on the second eye as a prophylactic measure, where it is probably the only time in his life when the man can get the services of a competent ophthalmic surgeon.

Dr. Jennings: Unfortunately, I was not able to be present at Dr. Elliot's operations. As regards the question how soon are we to operate? It seems to me that the enthusiasts in this operation are inclined to operate at once. Recently, I have had under my care an English lady, who developed glaucoma, and for two years I have kept the tension normal and the field the same by the use of eserin. About three months ago she started back to England and I gave her instructions and a letter to a London Ophthalmologist, and I have just learned that she had hardly set foot in England before both eyes were operated upon. In all of the cases in this operation, I reported last year, I always secured the conjunctival flap after the operation by several stitches. I think this is a wise plan and saves trouble. Yesterday a gentleman came to me who has been blind in both eyes for five years from glaucoma. A Southern surgeon had not done the Elliot operation, i. e., trephining at the limbus, but had made a trephine opening in the sclera, 5 mm. back of the limbus and the tension is now perfectly normal. It seems to me that this case is of interest, as showing the mere opening into the sclera and covering it over with the conjunctiva is just as efficacious as if it had been done at the limbus.

Dr. Loeb: It seems to me there are two points in regard to Col. Elliot's operation that we must keep in mind. As far as the operation itself is concerned, it seems to be easy except for the splitting of the cornea. I believe any one who has had experience as an operator could do the operation. But I do not believe the length of time the operation has been in use is sufficient for us to make a judgment as to the final outcome of these cases. We do not know how they are going to turn out in five years from now. These holes may close up. There may be an increase in tension. In the second place, after all, the increase of intraocular tension is not the disease glaucoma. It may cause the bad results, the crushing out of the optic nerve fibres and the excavation of the disc, but there is more to the disease than this. Because we can relieve the increase of tension is no reason why we should cease our efforts to determine its cause. Only after we have succeeded in combating the etiology of glaucoma will we be able to speak of its cure. As a symptomatic treatment, I believe the Elliot operation is one of the best, if not the best.

Dr. Charles: Perhaps the case I have to report will answer some of these questions. Dr. Jennings spoke of a case under his care for two years. The following concerns an eye almost normal for two years before an acute attack.

In July 26, 1905, Mrs. L. S. E., 57, under my observation at that time fourteen years telephoned for relief from a severe neuralgic pain over right eye with redness. She received cocain, gr. 1, adrenalin 1 in two ounces of water. On the next morning her tension was normal and it was decided that she did not then have glaucoma. With correction vision was normal R. & L. Except for correction of refraction and a rather frequent conjunctivitis patient had been free from treatment most of the time until Oct. 1911, when the tonometer showed O. D. 20 mm. and O. S. 26 mm. and her blood pressure varied from 140 to 118 mm. She was given pilocarpine for home use with which complete miosis was obtained. Rainbow vision was noted at times. The pupil of the right eye was slightly larger than that of the left. Reactions all normal. O. S. 19/15. No special change until June, 1913, when tension was O. D. 25, O. S. 23 mm., and the patient was complaining of neuralgia around the right eye. At no time did I see her in an attack. Her discs were slightly cupped. In my absence, Sept. 3rd, Dr. Hardy sent her to St. Luke's with an acute attack of glaucoma. He used eserine freely in both eyes, gave the patient cascara and calcium chloride and upon my return Sept. 14th her vision was O. D. 19/19+ and O. S. 19/15. Tension 23 mm. R. & L.

Fields only slightly contracted nasally, unusually a good result. She was operated upon by Col. Elliot Saturday, Oct. 26th. The operation was executed beautifully upon a well-behaved patient. Atropine was used every day for three days. The whole area is now oedematous, the anterior chamber more shallow than formerly and her refraction has changed so much from displacement of the lens forward that with the old glasses her vision is only 19/60 while — 1. Sph. addition is required to reach her old acuity of 19/19. The patient is still too nervous to obtain an accurate result with the tonometer but the intraocular pressure is perceptibly lower than that of the left eye and very much lower than before the operation. The coloboma is a scarcely perceptible slit in marked contrast to the deformity seen after an iridectomy for glaucoma. In regard to the preparation of the nervous American patient, it seems to me that bichloride 1-3000 in the eye and scrubbing the conjunctival sac with the application was unnecessarily severe. I believe in the taking of smears and cultures beforehand and appropriate preliminary treatment, as well as the use of thorough irrigation at the time of the operation. Also, I believe that it is a good plan to use normal saline solution during the rather long operation, for the purpose of preventing desquamation of corneal epithelium. These are mere details, however, and not intended to be a criticism of the operation itself.

Dr. Green: I presume most of the members of the section will agree the vigorous scrubbing of the conjunctiva, as practiced by Col. Elliot, is unnecessarily severe, at least for American patients. He acquiesced to my suggestion that this fact of the preliminaries be dispensed with and contented himself with squeezing the meiboemian glands and douching the sac with 1/3000 bichloride.

Dr. Charles: The main point about this patient of mine, as you noticed, was that it was virtually almost a normal eye. It had been followed for two years since October, 1911, kept under control with pilocarpin at home, until she came to Dr. Hardy with acute glaucoma and a blind eye, and he brought it out of the attack with almost normal vision.

Dr. Post: Did Col. Elliot omit the scrubbing process entirely after this operation?

Dr. Green: Not in any that I witnessed.

Dr. Ewing: Here I wish to add that among the fifteen operations performed in my presence, the most quiet patients were four at St. Luke's Hospital, with whom a 1 per cent. holocain solution was used in the eyes every ten minutes for half an hour preceding the cocain.

Dr. Charles: As to holocain, it seems to me that the use of a local anaesthetic, far enough ahead to have it soak in thoroughly, is to have the patient comfortable and easy to handle without the toughening effect on the cornea by the too frequent use of cocain. Just before the operation I use cocain.

Dr. Green: It may be of interest to the members to know of one case that Col. Elliot operated for me in which after the removal of the button, there was no prolapse of the iris. In that case the Colonel did not make any attempt to do an iridectomy. He fears that damage may be done by an attempt to get out a peripheral scrap of the iris in those cases in which the iris fails to present.

Dr. Jennings: It seems to me that if the ideal section were made the iris would prolapse.

Dacryo-Cystitis.

Drs. Meyer Wiener and Wm. F. Sauer: The importance of insisting on a thorough and careful examination of the nasal end of the tear duct is emphasized by the cases here reported. I well know that the thought is ever uppermost with the majority of practicing ophthalmologists of the existence of a close relationship between lachrymal obstructions and inflammation of the nasal mucous membrane, but I also believe as the appended cases will show, that sufficient care is not always taken in determining the exact cause of obstructions of the tear duct.

Case 1. Mrs. A. D., 70 years of age, native American, consulted me on October 19, 1905, for a mucocele of the right eye sac, which she stated had been present for more than a year. Previous to that, however, she had been troubled with tearing for a period of several years. She had consulted several ophthalmologists, had been subjected to numerous probings and washings of the sac with little or no benefit having been derived. She insisted that she had no nasal catarrh, was not subject to colds and demonstrated that she could easily breathe through either nostril. I washed out the sac but was unable to force any fluid through the nose, the solution regurgitating through the upper punctum. A No. 6 Bowman probe was easily passed through the duct to the nose.

It was with difficulty that she was persuaded to have an examination of the nose made; the report showed, however, no abnormality of the nasal cavity. At the insistance of Dr. Sauer, another examination was made at his office with the probe introduced into the nose. A membranous obstruction prevented the probe point from entering the nasal cavity, although it could be distinctly felt and seen through this thin membraneous obstruction. On October 26 the obstruction was removed by Dr. Sauer after which fluid readily passed through the nose and the mucocele permanently disappeared. This patient was last seen by me January 30, 1911, and was at that time free from any apparent trouble with the lachrymal apparatus.

Case 2. Mrs. B. O., 50 years of age, native German, consulted me July 10, 1913, suffering with chronic dacryocystitis of the right sac. She had had many months of treatment by various ophthalmologists, but had given up in despair, and had had no treatment for eighteen months previous to my examination. The last treatment had consitsed of expressing the contents and the passing of Bowman probes. The physician had sent her to a rhinologist, but the report came to him that the nose was in perfect condition. I also experienced some difficulty in having another examination made in this case, but succeeded in persuading the patient to be examined with the introduced probe, which examination was made August 1, 1913. A No. 4 Bowman probe slipped easily down into the nose. Examination of the nose showed that here also the free exit of the probe was prevented by the presence of a thin membrane covering the opening of the duct; this obstruction was slit on August 14, after which time the pus from the sac drained through the nose. This opening soon closed, however, necessitating an excision of the membrane about four weeks later. The patient has been free from accumulation of pus in the sac and also from excessive tearing for the last month.

I wish to lay particular stress upon the importance of the nasal examination made with the probe introduced. This can be done by the ophthalmologist himself, or by the nose specialist if he is practiced in the art. And there are some who are quite proficient.

In a search through the literature, de Schweinitz is the only authority that I have been able to find who described a similar condition and emphasizes the necessity of exposing the lower entrance of the nasal duct into the inferior meatus by means of the nasal speculum, after the probe had been introduced.

Dr. Sauer: As stated by Dr. Wiener a pathological condition of the lachrymal canal may exist at its nasal orifice which cannot be detected by the ordinary methods of rhinoscopic examination. The opening of the duct is high up under the inferior turbinate and can be seen only with a Holmes' pharyngoscope, or when a part of the turbinate is removed. It is therefore necessary to pass a Bowman probe from above in order to locate the point of obstruction. In the cases reported by Dr. Wiener this was done. A part of the inferior turbinate was removed. The end of the probe was then located in a pouch of mucous membrane. The movements of the probe within the sac could be seen through the nose. The sac was then removed and the probe passed readily into the nose. A few probings were required to maintain the opening.

At various times attempts have been made to probe the nasal duct from its nasal orifice. La Forrest made the first attempt in 1730, but owing to the short distance between the opening of the duct and the floor of the nose, only a small portion of the canal could be reached. This method had been given up until Polyak resurrected it in 1902. He had a number of probes constructed with which he claimed to be able to dilate the lower portion of the canal, and reports three cases in which he succeeded in curing the epiphora. As far as I was able to learn, no one adopted his method. Caldwell made the first attempt to open the nasal duct through the nose in 1893.

In 1901 Passow described an operation in which after introducing a Bowman probe from the lower punctum as far as possible, he introduced a punch forceps in the nose and removed the anterior end of the turbinate as well as the nasal wall of the lachrymal duct, until he reached the probe. He reports a number of successful cases. Eight years ago, Hyman, of Berlin, advocated fracturing and turning up the inferior turbinate in those cases where the obstruction was due to a turning outward and upward of the lower margin on the turbinate, especially in roomy nasal passages. When the passages were narrow he removed a part of the lower turbinate as well. Since Passow described his first operation, a number of rhinologists have devised various methods for securing a permanent opening of the canal. West, Polyak and Halle have each devised an operation for opening the duct and sac through the nose; the principle involved is the same in all three, the difference being a slight variation in the technique. After incising the mucous membrane just in front of the insertion of the middle turbinate, making either a curve or rectangular incision, the mucous membrane is then elevated and the flap turned up out of the way. The nasal wall of the lachrymal duct is then chiseled away until the sac is reached, being careful not to injure the membraneous canal. The membrane is then incised up as far as the sac, when the nasal wall of the sac is removed as in Toti's operation. Halle and West replace the flap of mucous membrane, leaving a free communication between the lachrymal sac and nose; Polyak removes this flap. West has done this operation in 130 cases and claims to have been successful in 90 per cent. In some of the cases an external operation had been performed, and in these cases the results were not satisfactory; Polyak had operated upon 31 cases with satisfactory results.

In December, 1911, Yankauer described an operation in which he makes a horizontal incision ¼ inch in length, just in front of and above the anterior end of the middle turbinate. This incision is then carried down to the anterior end of the inferior turbinate when it is carried backward along the lower margin of the inferior turbinate for ½ inch or more; the mucous membrane below the inferior turbinate is also dissected away from the turbinate, leaving the bony portion of the turbinate exposed; this portion of the turbinate is then removed with a pair of forceps as far back as the opening of the lachrymal canal, the canal is then opened with a suitable forceps. The nasal wall of the entire bony canal is removed, after which an incision is made in the membraneous canal as far up as the sac; this incision is made along the posterior wall of the canal and the flap is turned forward. The nasal wall of the lachrymal sac is removed with a pair of forceps, after which the mucous membrane of the nose is stitched back in place. The nose is packed for 24 hours, at end of which time the pack is removed and the canal is irrigated from the upper punctum with a normal salt solution. This is kept up for several days. He has operated upon nine cases, with satisfactory results in eight.

In 1911, Von Eichen devised an operation in which he opened the canal from the maxillary sinus. After opening the canal he removed a portion of the sac, since that time he has modified his operation by entering the canal from the canine fossa, without opening the antrum; his operation is done under cocain anaesthesia and claims that the operation is easier and a better view of the work is obtained than when working intranasally.

DISCUSSION. Dr. Luedde: I would like to report a case of this type. A man came to my office with the swelling usual in lachrymal obstruction. He said there had been no pain, but that this swelling had been there for more than four months. When I injected borax solution into the lower punctum it passed freely into the nose. I then passed a Bowman probe to the nose without obstruction yet the swelling remained. I could move the mass in front of the probe but could not rupture it by moderate pressure. I then passed a sharp probe as far as mass, brought the tip forward in the lachrymal fossa and stuck it into the mass. There was a gush of blood—stained watery fluid—and the man was "cured." The swelling did not recur though under observation for months. The patient believed this swelling was brought on by his habit of blowing his nose severely. It evidently was a simple membraneous sac. A careful nasal examination in this case failed to reveal anything abnormal.

Dr. Wiener, in closing: The point I wanted to bring out mainly, and which I hoped the members of the Section would appreciate, was the fact that the nose in these cases was seemingly practically normal. Now you have all had cases which have been sent to the nose specialist, which he has examined and found pronounced involvement of the inferior turbinate or a bulging of the septum, or involvement of the lower part of the nose. In one case, I do not recall now the name, but Dr. Sauer had passed upon that case as a normal nose, the patient had been sent to Dr. Alt, and Dr. Alt had sent her to Dr. Sauer some years ago and Dr. Sauer had said the nose was normal. Of course I know Dr. Alt is not to blame: he did his part to ascertain the cause, and then later this same patient came to me. We had had some experience in the meantime and Dr. Sauer then passed the probe and found this membraneous obstruction. You could see the thing move behind the membrane. I could not get a bit of fluid through, and that was the point I wanted to bring out. That every examination of the nose for an obstruction of the nasal duct should be made with a probe previously introduced. De Schweinitz mentions the fact that very often we have a little membraneous fold obstructing the opening of the duct, although he did not mention the fact there was a complete membraneous obstruction.

REPORT OF THE MEETING OF THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

December 11, 1913.

"The Etiology of Uveitis."

Dr. Zentmayer pointed out the change that had taken place in recent years in the assignment of causes and their relative frequency in causing uveitis. Some years ago there were two classes under which the vast majority of cases were placed: Syphilis, and most of the remaining rheumatism. Today the latter as a cause is scarcely recognized. This, however, has come about in part by the more restricted sense in which the term rheumatism is now used, being applied alone to cases of rheumatic fever. The other affections in which arthritis is a symptom have mostly been traced to a different origin.

What I shall have to say will be largely a resume of the exhaustive survey of the subject by de Schweinitz at the international congress last August. The extreme vascularity of the choroid makes it prone to inflammation, especially endogenous processes. Due to the persistence of Michel, tuberculosis is now recognized as a frequent cause of choroiditis as well as inflammation of the anterior part of the uvea. Syphilis is the cause in at least 60% of both iritis and choroiditis.

Not all clinicians are prepared to eliminate rheumatism as a cause. As you well know Krückmann has described a fibrinous type as characteristic of rheumatic and gonococcal toxemia. Gout which at one time was considered a not infrequent factor is now considered by some to cause iritis only indirectly by its general toxic action. Gonococcal uveitis is a well recognized entity and besides the particular type assigned to it by Krückmann it produces a kerato-iritis in which minute vesicles form on the cornea and in which the inflammation is of a quiet type. As might be gathered from what has been said concerning the exclusion of various types of arthritis from the class of rheumatism because they have been found to arise from foci of staphylococci elsewhere in the body, these organisms ar now rightly considered the etiologic factor in the small numb of cases of uveitis complicating these affections. Since El chnig's first communication on uveitis resulting from autotoxemia, there has arisen a considerable literature on the subject, some of which opposes his views. As the conclusions of de Schweinitz on this subject are based upon the results o elaborate metabolic examinations in a series of cases of different forms of choroiditis and chronic uveitis, I shall quote them in part: "Inasmuch as intestinal putrefaction certainly depends upon the activity of bacteria upon the food-stuffs in the intestines, there seems good reason to believe that these bacteria or their toxic products may be the cause of an inflammation of the uveal tract, exactly as bacteria from other foci of suppuration have a similar influence. In this sense, therefore, gastrointestinal intoxications have a right to be included among the etiologic factors of uveitis."

Malaria, diabetes and nephritis are undoubtedly occasional causes of inflammation of some part or other of the uveal tract.

"The Treatment of Choroiditis."

Dr. Reber spoke of the advance that had been made in the therapeutics of choroiditis in the last twenty years. In the early 90's most patients with choroiditis were promptly placed upon inunctions and iodides and it was seldom that anything else was done for them. With improved laboratory methods it was found that certain forms of low grade choroiditis associated with uveitis were at times associated with gastro-intestinal toxemias, as pointed out by Elschnig, de Schweinitz and others.

The laboratory diagnosis of syphilis has also helped us to a most intelligent therapeutics. The various tuberculin tests have enabled us to differentiate the now well recognized tuberculin choroiditis and a question now being raised is whether choroiditis and uveitis are ever related to intra-nasal and accessory sinus disease. Because of the overwhelming preponderance of syphilis as an etiologic factor, salvarsan and neo-salvarsan have come into vogue as potent remedial agents in this form of the disease, and there is now question as to the value of the arsenical preparations in such inflammations of the vascular tunic of the eye.

In the tubercular forms of choroiditis the treatment of tuberculosis proper is naturally in order and in the auto-toxic forms the best possible elimination naturally forms the basis of the treatment. In recent years the sub-conjunctival injections of normal saline solution and of weak oxy-cyanide of mercury solutions has been highly commended. We have ourselves seen the most brilliant results from this method of treatment and we have a distinct feeling that it might well be added to the other internal treatment in the treatment of sub-acute chronic choroidal lesions.

"Retino-Choroiditis Juxta-papillaris."

Dr. Appleman reported a case of what Edmund-Jensen named Retino-Choroiditis Juxta-Papillaris, a localizing inflammation involving the retina and choroid immediately beyond the disc and occurring in young healthy adults without history of lues or other dyscrasia.

The case reported by Dr. Appleman consulted him because of slight blurring of vision and pain in the left eye, which had appeared three days previously, with pain near the inner canthus. The blurring had increased since he first noticed it.

Vision without glasses equalled 5/6 in each eye, increased in the right eye to 5/3, and the left to 5/4 with glasses, which consisted of plus 0.25 sph. plus .25 cyl. axis 90° right eye, and plus 0.25 sph. plus 0.50 cyl. axis 90° left eye.

Ophthalmoscopic examination revealed the media clear, disc swollen plus 3 D., and its edges obscured. The swelling extended into the retina above and to the temporal side, gradually blending with the normal retina in the neighborhood of the macula. The swelling was white at its thickest part just off the disc, and gradually diminished toward its periphery. The vessels were hidden by the swelling of the retinal fibres, the veins being gorged and tortuous. Slightly above the macula, four small, parallel, radially disposed hemorrhages were seen. Examination of the visual field revealed an absolute scotoma involving the area of the blind spot and extending over a portion of the nasal field. At the present time it involves practically the whole nasal field.

One week after he was first seen vision was reduced to 5/21 in the affected eye, probably due to the vitreous opacities which appeared about this time.

Treatment consisted of hot compresses locally and 1% atropin solution. Sweating by means of hot packs given daily, followed by inunctions of mercurial ointment to the point of salivation and later the administration of potassium iodide. By these measures the inflammatory condition began to improve, as did his vision.

At the present time he shows an area of degeneration near the disc, up and out, with some pigment heaping, involving an area about half the size of the disc, although there has been but little choroidal absorption in comparison to what I expected would occur. The disc edges are now fairly distinct. The vitreous opacities have disappeared, and his visual acuity is 5/6 without correction. This is improved to 5/5 with his correction.

The visual field is of prime importance in deciding whether the prognosis is a neuro-retinitis or an exudative choroiditis in juxtaposition to the nerve head. The most important and most constant change in neuro-retinitis being a concentric contraction of the visual field, enlargement of the blind spot and formation of scotomas, whereas, in localized choroiditis the visual fields will show a scotoma corresponding to the portion of the fundus involved, the course of the inflammation being relatively benign, and the loss of central vision practically *nil* unless the macula be involved in the process.

Jensen believed the loss in the peripheral field to be due to a thrombosis of the arterial vessels in this area as a result of the exudate, and consequently the area supplied was deprived of perception.

Gross Peterson, who last year reported a series of fifteen cases, attributes the visual defect to a destruction of the nerve fibres produced by the inflammatory focus. This seems to me the most plausible explanation.

As to the causation of this condition, disease of the accessory nasal sinuses should be thought of. The possibility of a toxin giving rise to the localized inflammation has been suggested, although not proven.

References: 1. Edmund—Jensen (Arch. f. Ophthl., Aug., 1908); 2. Gross-Peterson (Klin. Monatsbl. f. Augen., Aug., 1912). Abstract from Ophthalmology, April, 1913.

W. Walter Watson, M. D., Secretary,
1712 Walnut Street, Phila., Pa.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of December 20th, 1913.

DR. C. E. WALKER, PRESIDING.

Retro-bulbar Neuritis.

Dr. W. A. Sedwick presented a man aged forty-six years, who had come on November 24, complaining of pain and loss of vision in the left eye during the previous three days. He had had asthma for five years, and had pulmonary tuberculosis. Wassermann test and examination of the urine were negative. A skiagraph having indicated possible involvement of the sphenoid, a nasal operation had been done, but without revealing any sinus disease. The left optic disc had been swollen 3 D. and this eye was blind. There had recently been slight swelling of the right disc. Tonight there was no distinct swelling of the right disc, but vision of the right eye was reduced to 20/200. The left disc was no longer swollen, but slightly concave, and showed some beginning pallor.

DISCUSSION. Dr. Black suggested trying tuberculin, keeping well within a marked reaction.

Dr. Bane stated that the rhinologist had opened into the left sphenoid and found an immense cavity but no suppuration. There had apparently been great reduction in the swelling of the disc since this was done.

Drs. Libby and Crisp were in favor of opening up the right sinus in spite of the absence of definite nasal indications, in view of the absence of other known etiology, and of the marked change which had occurred in the left disc since operation on the nose.

Interstitial Keratitis.

Dr. H. W. Aufmwasser presented a youth of nineteen years, who since October, 1912, had been suffering from interstitial keratitis. The right eye was first affected, the left becoming involved two months later. Both parents had died of tuberculosis, and the Wassermann test was positive. In March

1913, there had been a swelling of the right knee due to effusion in the synovial sac. The treatment had consisted of mercurial inunction, three doses of salvarsan, and the local use of atropin, yellow oxide of mercury, thiosinamin, and subconjunctival injections of salt solution and cyanide of mercury. The right eye was almost free from irritation, but the disease was still very active in the left.

DISCUSSION. Dr. Libby thought that the marked improvement in the right eye gave a favorable prognosis for the left.

Dr. Neeper would make another Wassermann test, upon the outcome of which further treatment should depend, antisyphilitic remedies being pushed if it proved positive.

Dr. Patterson referred to a case of interstitial keratitis from congenital syphilis in a woman of twenty-three years, which had been considerably benefited by an intragluteal dose of salvarsan.

Bitemporal Hemianopsia.

Dr. W. C. Bane presented a woman aged seventy-five years, who was blind in the temporal half of each visual field. Examination in 1909 had given very slight indication of some disturbance of the nasal half of each retina. Corrected vision was right 5/10, left 5/50. The discs were decidedly pale, especially the left. The patient had had an apoplectic seizure three months ago but showed no present signs of paralysis. Her condition was otherwise normal for her age.

DISCUSSION. Dr. Black thought the possibility of a pituitary lesion should be considered.

Band-like Opacity of the Cornea.

Dr. G. L. Strader presented a man of middle age, who had had poor vision in both eyes ever since he was three years old, at which time he had a vague recollection of having had to protect his eyes against the light. He had been able to read until seven or eight years ago, and had never been able to get lenses which improved his vision. Each eye presented opacities, involving principally a broad area of the cornea roughly corresponding to the palpebral fissure, but also present in lesser density in other parts of the cornea. The corneas were slightly conical, but correction, consisting of minus spheres with several D. of minus cylinder, improved vision very little. Very little gain was had from dilatation of the pupils. Vision was fingers at six or eight feet. For ten years the patient had had tic doloureux on the right side of the face, provoked by any slight touch on the cheek.

Penetrating Injury at Sclero-corneal Limbus.

Dr. Melville Black presented a boy aged nine years, who seven weeks ago had been struck on the right eye by a blunt arrow, the result being a penetrating wound at the sclero-corneal junction involving the ciliary body and iris. He had not come in from the country until three weeks ago, and it had been necessary to depend on home treatment with atropin and dionin. The vision was almost nil, the eye was getting worse, and enucleation had been advised, on account of the danger of sympathetic disturbance. Was it advisable to try the effect of iridectomy and removal of lens substance?

DISCUSSION. Opinions in favor of enucleation were generally expressed.

William H. Crisp, Secretary.

CORRESPONDENCE.

New York, March 17, 1914.

Editor Ophthalmic Record,

Dear Sir:—I congratulate Dr. F. B. Tiffany on his successful operation for detached retina (Ophthalmic Record, March, 1914, p. 1321). I suggested trephining for *detachment of retina* in a paper, read before the Section on Ophthalmology, N. Y. Academy of Medicine, *October 20, 1913,* published in the January number of the Ophthalmic Record, 1914:

"I would like also to suggest trephining in cases of *detached retina.* In these cases I always performed the time-honored paracentesis of the retro-retinal exudate with the Graefe knife, in the approved way of turning the knife in the wound. I cannot help thinking that such an incision closes up very rapidly and that a trephining, which should cut out only a small hole and leave some sclerotic tissue at the bottom of the disc, will better allow the ultimate absorption of the exudate by a pressure bandage." (p. 7.)

Very truly yours,
R. Denig.

Kansas City, Mo., March 18, 1914.

Editor OPHTHALMIC RECORD,

Dear Sir:—Up to the time that my article on trephining for detached retina was published in the OPHTHALMIC RECORD, of March, 1914, I had not read or heard of anyone's making this operation. But in the report of the same issue of the RECORD of Colonel Elliot's address before the Section of Ophthalmology and Otology, Medical and Chirurgical Faculty of Maryland at Baltimore in December, 1913, it was mentioned that Doctor Parker, of Detroit, had made the operation. And I received, too, from Doctor Rudolph Denig, a reprint of the trephining operation in general, in which he suggested that the method might be efficacious in the treatment of detached retina. However, as far as I am concerned, the operation was original with me as I was quite unaware that anyone else had thought of it. I am glad to know that the operation appealed to others as a valuable and safe treatment. Even in the case of Elliot's trephining for glaucoma, it appears that unknown to him, a Scotch oculist was practicing the operation simultaneously with him.

I had thought to delay making a report until I had further experience with the operation. But I was urged by my colleagues not to wait, but to allow the report of the first cases to go to publication. My experience only serves to remind us again that there is nothing new under the sun, even to the thoughts of men. Darwin's "Origin of Species" was rushed to press at the insistent demand of his friends who wished him to have the credit of the theory of evolution. Wallace, who died only recently, had ready for publication at the time, a work on the identical theory. Each man quite in ignorance of what the other was doing had reached by separate routes the same generalizations.

It isn't so much the priority in this treatment for detached retina that I wish as it is the satisfactoin of knowing that different ones of my confreres throughout the world are advocating and practicing the same treatment. A few days ago I received a letter from Colonel Elliot saying that he had thought of the operation while he was yet in practice in Madras; and that he had incorporated in his new edition of his work on ophthalmology which is soon to go to press, a report of my operation, giving it his unqualified endorsement

The more experience I have, the more I believe that it is the treatment up to the present time for detached retina. It is more rational, and promises better results than any other treatment we have yet used.

The cases that promise the best results from this operation are those that are traumatic and of recent date. Cases resulting from a high degree of myopia do not promise well. When the detached retina is caused by tumor either of the choroid or retina, there is no treatment either medical or surgical that will be of any avail. In order to secure the best results from the trephining, the patient should be in a hospital where he can be kept quiet in a recumbent position, and where his diet and bowels can be regulated. I advise that these patients be kept in bed for at least two weeks subsequent to the operation

Sincerely yours,

Flavel B. Tiffany.

Editor of the Ophthalmic Record.

Dear Sir: In the April issue of the Record there is a paper entitled "Muscular Imbalance," by Dr. Jos. L. M'Cool of Portland, Oregon.

As reported in the Record I find that in the discussion Dr. Wright is quoted as saying the following:

"Dr. Todd told the speaker that he had abandoned the tucking operation as many of those cases came back with their old trouble."

I wish to state that either Dr. Wright is misquoted or that he has made a mistake in his statement, for I have not abandoned the tucking operation and find its effects permanent so that patients do not return with their old trouble, and quite to the contrary have not performed any other advancement operation than the method of tucking which is described by the undersigned in The Journal of the A. M. A. Jan. 5th, 1905, for thirteen years, for the reason that it has proved to be so satisfactory. It may be that there are some other operations that may be as effective, but I see no reason to abandon the operation I described in view of the satisfaction it has given me.

I am very glad to note that later in the discussion Dr. Dickson is quoted as saying that he "has had occasion to use the tucking operation four times, with success resulting in three. He has used the Todd tucker, likes the operation, and was somewhat surprised to hear Dr. Wright say what he did about it." Respectfully yours,

Frank C. Todd.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Casey A. Wood of Chicago has returned from a vacation in California.

Dr. J. W. Barrett of Melbourne, Australia, is spending a vacation in New Zealand.

Dr. William A. Walters of Billings, Montana, is going abroad for a period of study.

Dr. George James Burch, lecturer on physiological optics at Oxford, England, died recently at the age of 62.

The American Ophthalmological Society holds its annual meeting at Hot Springs, Virginia, May 12 and 13.

Professor Theodore Axenfeld of Freiburg is to be the guest of the Section on Ophthalmology of the American Medical Association at the Atlantic City meeting in June.

The presessional reprint of the Section on Ophthalmology of the American Medical Association will soon be issued. Dr. George S. Derby, 7 Hereford St., Boston, is secretary of the Section.

Dr. Nelson Miles Black of Milwaukee addressed the Illuminating Engineering Society in Chicago on April 10, his subject being "Physiology of the Eye and Its Relation to Signal Affairs."

Dr. John Edwin Brown of Columbus, Ohio, leaves shortly for a summer in Europe, where he will attend the Oxford Ophthalmological Congress and the International Ophthalmological Congress at St. Petersburg.

The Ohio State Medical Association meets in Columbus, May 5, 6 and 7. Dr. Harold Gifford of Omaha will deliver the principal address in the Section on Ophthalmology, his subject being "Some Observations on Sympathetic Ophthalmia."

The Illinois State Medical Society meets at Decatur, May 19, 20, and 21. An interesting program is offered by the Eye, Ear, Nose and Throat Section. Dr. H. W. Woodruff of Joliet is president, and Dr. Carroll B. Welton of Peoria is secretary, of this section. ———

The Pacific-Coast Oto-Ophthalmological Society meets in Seattle, Wash., July 1, 2, and 3. The guest of honor will be Colonel Robert H. Elliot of London, England, formerly in the Indian medical service, who will speak on his operation of trephining for glaucoma. ———

From Pittsburgh comes the story of a farmer who had the unique experience of having his artificial eye explode, however without injuring him. The explanation given was that such eyes are hollow with a near-vacuum like an electric light bulb. Heat may have been the cause of the explosion. He is said to have been reading about the Mexican question.

NEW BOOKS.

REPORT ON THE OPHTHALMIC SECTION OF THE DEPARTMENT OF PUBLIC HEALTH, 1912, by the Director of Ophthalmic Hospitals, A. F. MacCallan. Cairo, Egypt. Government Press. To be obtained, either directly or through any Book-seller, from the Publications Office, Government Press, Bulaq. 1914.

THE ANATOMY OF THE BRAIN, a manual for students and practitioners of medicine. The brain of the sheep (Ovis Aries) being selected for description and illustration because of its availability and its practical identity with the human brain for laboratory use. By J. F. Burkholder, M. D., Professor of Ophthalmology in the School of Medicine of the Loyola University. With an introduction by Prof. Henry H. Donaldson, with forty full page plates (six of them colored) from original drawings by the author. G. P. Engelhard & Company, Chicago, 1912.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2-30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) M. Frank (E. M. D.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P. G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

Vol. XXIII CHICAGO, JUNE, 1914 No. 6, New Series

ORIGINAL ARTICLES

PHLYCTENULAR CONJUNCTIVITIS, ITS IMPORTANCE IN THE CONSERVATION OF VISION.

BY BEN WITT KEY, M. D., NEW YORK CITY.

In this day when there is so much investigation into the causes of blindness and so much thought given to the subject of conservation of vision, it has seemed to me fitting that one's attention should be directed toward a cause of blindness that is more far-reaching than is suspected, either by the laity or by the profession, namely, Phlyctenular Conjunctivitis. It is regarded by the laity, generally, as of no great importance, because vision is often restored, at least partially restored; it has none of the horrors of operation: a good prognosis is usually given hastily to the patient or parent; the condition becomes better at times; and seldom all vision is lost. It is regarded by the profession, too often lightly, a case difficult to examine and treat; the diagnosis and extent of involvement too often hidden through superficial examination: many cases are entirely relieved; vision at least partially restored; the opacity may clear away with time or drugs: and a prescription of Hydrargyri Oxidum Flavum quickly relieves the nervous system of the parent, child and physician! ! ! !

It is not my purpose to make here any criticism of methods of treatment or to condemn the hasty and superficial manner of examination and diagnosis so often employed in these cases (though there is ample room for such), but rather to appeal to the highest court of justice, the CONSCIENCE of the PHYSICIAN, for more careful examination and study of the cause, course and treatment of these cases, no matter how slight or trivial they may seem to be.

In making this appeal, therefore, it is unnecessary to enter into a review of the pathology and symptomatology of phlyctenular conjunctivitis (conj. eczematosa; conj. herpetica; conj.

scrofulosa, etc.), but rather to emphasize the value of studying the cause, course, complications, sequellæ and treatment of this disease.

Phlyctenular conjunctivitis may be regarded as bulbar, marginal, and corneal; a matter of location only. From the standpoint of the conservation of vision, we have to consider of most importance, the corneal phlyctenule, next the marginal for fear of extension, and of least concern the bulbar ones only as evidence or signals of probable later corneal involvement.

Etiology.

In our study of the etiology, we may expect to find always two factors operating: The first is usually some general systemic condition, which may be congenital or acquired, or both; the second is an exciting influence and is usually some local irritation. It is commonly recognized by the profession that the general systemic condition is of far greater importance than the local one, for it is, of course, the underlying or predisposing cause that prepares the field for the onset. Many systemic conditions have been enumerated as causative factors and much has been written about them, but may I offer the following as a practical outline for study in any individual case?

1. *Strumous Diathesis.* This class of cases presents a very familiar picture to any practitioner of medicine. It is known to be, as a rule, an acquired condition, but aggravating most probably a congenital insufficiency, which may be respiratory, circulatory, or gastro-intestinal, or a combination of these. One recalls the statistics gathered a few years ago by the Committee of the American Medical Association on phlyctenular conjunctivitis, investigating the most frequent cause of the disease, and whether or not these cases were tubercular or in what manner they may be associated with tuberculosis. It was the consensus of opinion that the scrofulous or strumous state is the basic condition, a tendency to, if not actually tubercular, and that the phlyctenule is a local manifestation, not tubercular, but rather a staphylococcus colony present under corneal epithelium. Is it not probable that this diathesis which tends to involve the lymphatic structures, glands, mucous membrane in the neighboring parts, in extension, affect in the same way the lymphatic channels of the eye,—perhaps lodging a focus here in the superficial corneal layer, where exposure or rubbing or strain or local irritation of some kind may make a favorable point of attack?

2. *Gastro-Intestinal Disturbances* follow closely upon the strumous types. Here we have the results of the many indiscretions in diet in adults, as alcohol, lobster, salads of all sorts, condiments, quantities of tea and coffee, and sweets. In children, from one year of age to puberty, the adult foods too early for proper digestion, as well as unwholesome foods, as cakes, pies, early sweet fruits (grapes, peaches, apples, etc.), candies, tea and coffee, sodawater, hot breads, soft breads, pretzels, pickles, beer, etc., are well established indirect causes of phlyctenular conjunctivitis.

3. *Disorders of the Teeth* are important factors, especially because of the close relation to stomach and enteric derangements. We must consider under this heading, two conditions—one, the teething period of childhood; and the other, the low per cent of efficiency of mastication in older children and adolescence, due to mal-formation of the malar bones, or the mal-position or decayed condition of the teeth. The one is the long recognized period of childhood, when there is general debilitation and susceptibility to the commoner diseases of that age of life: the other is now recognized as a definite obstruction to good health and is the result of the achievements of modern study and skill in Dental Surgery and Orthodontia.

4. *General Unhygienic Conditions* include that of city, home, school and place of occupation and all that these imply as to population, ventilation, sunshine, water and milk supply, personal uncleanliness, and the bare necessities of life, etc.

5. *General Debilitation* following the acute exanthemata, measles, pertussis and in convalescing from a long continued illness, bone tuberculosis, and the like.

6. *Intra-Nasal Conditions*, such as acute or chronic rhinitis (which is usually an associated rather than a causative factor), badly deflected septa, and other intra-nasal defects with their resulting effect upon proper respiration in childhood. Local extension of any inflammation of the mucous membrane, and obstruction of the lachrymal apparatus from this or from bony defects causing stagnation of the lachrymal stream, are factors worthy of note in every case of phlyctenular conjunctivitis.

7. *Absorption from Tonsillar Infection* is a causative agent that is often disregarded. My personal experience with many of these cases while in the New York Eye and Ear Infirmary and since that time, convinces me that we have, in re-

peated and continued tonsillar infection, a very significant and noteworthy cause of recurrent forms of phlyctenular conjunctivitis, particularly in older children and in adolescence.

8. *Refractive Errors* undoubtedly play a part in the etiology, and may be regarded as predisposing and exciting.

9. *Associated Conditions*, as herpes or eczema of the lids or face or nasal mucous membrane, and associated infections of the conjunctiva may be mentioned as causative, since they may be part of and coincident with the conjunctival phlyctenulæ, though both may have the same underlying cause.

The causes predisposing to phlyctenular conjunctivitis given above are those usually accepted and recognized as all-important, but there is every reason to believe that there is another factor, a local one, which, though secondary, is none the less important. And this is true because it is not appreciated, is often disregarded, and is entirely over-shadowed by the predominating symptoms and signs of the underlying cause. These local (exciting) causes may seem trivial, but they should be taken into account, especially because of their importance affecting the course, sequellæ and treatment of the disease. They may be classed as any local irritation, as, exposure to cold wind, dust, careless handling of the eyes, eye-strain (refractive), bacteria, and associated diseases as conjunctivitis, stagnation of the lachrymal stream, blepharitis, hordeoli, etc.

Course.

The course of phlyctenular conjunctivitis varies with the individual case. The reason for this is evident from the number of factors that influence it. The simple phlyctenule may be forgotten in twenty-four to forty-eight hours. The same may be true of a marginal involvement. But such is not always the case, and certainly should be significant of the general condition of the patient, and the attention of the family physician directed toward the correction of this. Then there is the phlyctenule on the iris area or pupillary area of the cornea, whose symptoms and pathology are well known, and which also may disappear without further course or cause for alarm, and leave the cornea as clear and transparent as before. But these corneal phlyctenules may return, may recur and recur, and may come to remain for months and more, at times indolent, at times pretty active.

The simple phlyctenule may become a "migratory pustule" or "single pustule," often central, always deep and destructive to corneal substance. The phlyctenular ulcer, so commonly seen, may follow upon the rupture of the epithelium covering an "efflorescence." The ulcer or pustule may spread into the deeper layers with abscess formation and loss of corneal stroma; hypopyon may appear, and even perforation with incarceration may supervene. In children, from one year to puberty, the acute and typical cases are seen, and is the more dangerous period, because of the difficulty in management and treatment. In adolescence, there occur usually simple corneal and marginal infiltrates, which can be easily and successfully managed, once the cause is definitely determined.

Complications and Sequellae.

The complications and sequellae refer to the condition of things past the point where ulceration or pustule begins, and the subsequent events. And here is found the reason for my contention that phlyctenular conjunctivitis is a serious disease, not so much in itself, but rather because it is the path that leads to complications and sequellae that are destructive to useful sight, either in part or in whole.

It is only necessary here to discuss the sequellae, since these are the results of the complications, and about them we are most concerned as to their effect upon later efficiency of vision. To enumerate:

1. Irregular Astigmatism, the sequel of recurrent attacks which leave a pretty transparent cornea, but irregular or uneven curvature.
2. Opacities of the Cornea—nebula, macula, leucoma, pannus—the more directly they encroach upon the pupillary region, the more important they become. These we must appreciate are the most common result of phlyctenular ulcers.
3. Leucoma Adherens, a fairly rare sequel fortunately.
4. Enucleation may be the inevitable end.
5. Subsequent Myopia with all that that implies in many cases.
6. Amblyopia ex Anopsia.
7. Muscle Imbalance, and deviations of different types, usually lateral (rarely vertical), as result of strain, or amblyopia or in the effort to secure direct vision.
8. Subjective Sequellae may be mentioned (which, though they are not concerned with conserving vision, are none the less important and should be offered as an appeal to the profession for conservation through proper care of this disease), as

a. Symptoms of headache, eye-strain and eye-pain.

b. The difficulty in seeing clearly, "living in a cloud."

c. General physical and mental depression, especially later in life, through the handicap of "lame eyes."

d. The cosmetic viewpoint of the possessor of a large macula, or pannus, or convergence, or both.

e. As a hindrance in occupation and the struggle for existence.

f. Many other considerations at various times in the life of the patient are met with constantly in the individual case.

When we pause to reflect upon the sequellae tabulated above and their far-reaching effects, directly and indirectly; and when we are compelled to accept the fact that "the greatest number of primary ulcers of the cornea as well as the greatest number of ulcers in early life originate from phlyctenular conjunctivitis," we are confronted by a problem that challenges the attention of the general practitioner as well as the study and best efforts of the specialist.

Differential Diagnosis.

In order to meet the requirements which these cases demand, the diagnosis and treatment becomes of paramount importance. In making a differential diagnosis, it is not always sufficient to determine only whether or not the case is one of phlyctenular conjunctivitis, but also to differentiate whether or not the condition is one of a simple efflorescence, bulbar, marginal or corneal, or a number of them, single or in crops; whether a single pustule or migratory pustule, and the extent of involvement; whether or not an active or indolent state of affairs, acute or subacute, progressive, stationary or reparative; phlyctenular pannus or fascicular keratitis; and whether or not associated with mucus or purulent discharge, and whatever complication is present or impending. And every case of the strumous type with photophobia, blepharospasm and lacrymation, and the ostrich characteristic of burying its face, is *not* a case of phlyctenular conjunctivitis. On careful examination there may be disclosed the onset of interstitial keratitis, trachoma, other forms of conjunctivitis, active ulceration, an imbedded foreign particle, a perforating wound, a caustic burn, a simple abrasion of the cornea, or many other less frequent conditions that might be mentioned.

The history of the case may be helpful in making the diagnosis, but again may be entirely misleading. And this is true especially in the case of small children. So that most dependence must be placed upon the examination of the eye. In adolescence and older children this is usually not a difficult task, but in younger children the time-honored method of examination must be resorted to. This consists in wrapping the child in a sheet, or having the arms and body held firmly by parent or nurse, and placing the head on a towel between the knees of the physician. In this manner the eyes are accessible to manipulation and the head held firmly and steady in position. If the lids are difficult to retract, a small, delicately made lid-retractor can be inserted gently under the upper lid and the examination made. In case the globe is rotated upward, a sterile cotton toothpick swab depressed carefully into the lower cul-de-sac (sometimes only necessary upon the lower lid) will bring the cornea downward in position for careful examination or treatment under properly reflected illumination. It is generally recognized as careless practice to instill a cocaine solution in these cases preliminary to examination, and no doubt there is strong feeling on this point, but my impression is, that should it be a question of a thorough examination with gtt. 1 of a 2 per cent cocaine solution repeated in five minutes, or a superficial examination without the cocaine, I would accept the former, so convinced am I of the necessity for a careful and thorough examination. However, it is certainly a rare case that cannot be managed without the use of cocaine. Immediately following the examination a rough drawing should be made as to the definite location of the phlyctenule and the extent of involvement approximately, together with a note as to the character of the attack and associated conditions. The value of such a drawing and note can hardly be overestimated in the management and study of the progress and course of these cases.

Treatment.

To dispose of the treatment of phlyctenular conjunctivitis by stating that one should treat the underlying cause, protect the patient from local irritation, and prescribe for the local condition, is to generalize where detail is demanded.

One word, CARE, is the keynote to the successful management of phlyctenular conjunctivitis: care in obtaining the history, care in examination of the case—thorough examination, but care in manipulation—care in treatment as to protection, as to treatment by physician or nurse or parent, at hospital or at home, as to restricting the diet, etc., and in the close observation of the case.

Care in taking the history and making the examination *is a large part* of the treatment in these cases, because the cause and diagnosis indicate proper medication. In order to combat the underlying cause, the history together with a thorough examination will usually reveal the indication for systemic treatment. Of these perhaps the most common is the indication for calomel and the regulation of diet. Calomel in doses of grain 1/10 three times a day for three or four days and followed by a mild aperient is a favorite method of prescribing it. This method is preferred to large doses, or more frequently repeated small doses, because it is not desirable to purge or deplete the patient at such a time. The syrup of the iodide of iron is one of the old reliable remedies always depended upon in strumous types. Small doses of potass. iodid. in the essence of pepsin is often most efficacious. In older children and adolescence the elixir ferriquinin. et strychnin. is a tonic the value of which will always be recognized in selected cases. The various mixtures of the hypophosphate of soda have been strongly recommended, as well as buttermilk, especially in the summer time, the juice of a lemon daily for a time, and many drug combinations that meet the demands of the individual case have been advocated.

The mouth in all cases should be examined for evidence of deficient mastication and the condition of the oral mucous membrane. The indication here is certainly clear.

The correction of general unhygienic conditions is a problem that must be met in the particular case, and is brought out by the history. It is unnecessary to review the numerous hygienic factors, since those of the home and its surroundings are the most important. And these often cannot be reached even by the physician; but they can be excluded from being a factor by placing the child in the hospital under proper surroundings, diet and treatment. Here arises the question, when does a case of phlyctenular conjunctivitis become a *hospital case?* Where it is suspected that the treatment will be or has been neglected; where the home hygiene and care is unsatisfactory; any case with a simple corneal "efflorescence," not to mention pustules, ulcers, etc. If our serious cases (corneal) of phlyctenular conjunctivitis could receive as much care and attention as our ophthalmia cases, and which I have tried to show they deserve to receive, the per cent efficiency of vision among postphlyctenular conjunctivitis cases would fairly jump to a high and decent level.

As to those cases associated with other diseases, being part of a symptom complex, it is hardly necessary to state that the herpes, eczema, rhinitis, or whatever it may be, should receive the physician's attention. Also intranasal defects, enlarged turbinates, deflected septa, adenoids and tonsils which on examination give evidence of interfering with the patient's progress, should be referred to the care of the rhinologist.

A large number of these cases are under considerable eye strain, and secondary to this, blepharitis, conjunctivitis, hordeoli, etc., are reflex. Rubbing, scratching the lids, careless handling or rough treatment may readily bring on an attack of phlyctenular conjunctivitis in a child, especially if the general physical condition is under par. Every oculist has seen many of these cases. Although the exact optical correction may not be determined because of the difficulty in opening the eyes, a rough estimate may be made by means of the ophthalmoscope. Or, if arbitrarily, a + 1.00 Sph. lens is prescribed till the eye is more quiet and will allow a careful examination to be made, splendid results may be realized. A fairly good indication of the need of a glass is where the instillation of atropine gives relief. This effect, of course, must not be confused with the relief which atropine gives in hyperemia of the iris from corneal involvement.

Besides the treatment of the underlying cause, the patient should be protected from local irritation, as: exposure to cold and wind and dust, etc. Dark glasses should be worn in all cases with photophobia. The patient should be forbidden, absolutely, to rub the eyes, even if the hands must be tied to enforce this rule. Whatever local medication is necessary at home is best given by gently drawing down the lower lid and there instill the drops or deposit the salve as the case may be. The parent or nurse should not attempt to open the eyelids forcibly, or to drop the medicine on to the cornea, or to roll the salve and cotton swab carelessly against the cornea, or to manipulate the lids more than is absolutely necessary. Such local irritation, together with a strumous diathesis as the basic or underlying condition, may cause a case of phlyctenular conjunctivitis to remain subacute for months, with repeated acute attacks every week or two.

Many local remedies have been employed. In the acute stage argyrol in 20 to 25 per cent solution three times a day and bichloride vaseline (1-10000) or boric vaseline (petrolatum alba) at night is the best. Atropine in proper strength can be used whenever indicated and not simply because it is a case of phlyctenular conjunctivitis. Bathing the eyes with boric acid solution and the use of hot or cold compresses in this stage of the disease are measures worse than useless.

Later, when the condition becomes subacute, yellow oxide of mercury ($\frac{1}{4}$ to 1 per cent) may be used with splendid results, the strength of the solution being increased as indication demands. Also calomel (pulveris) when dusted into the lower cul-de-sac is efficacious in this stage of the disease (being mindful of its contraindication where syr. ferri. iodid. is prescribed).

The case of a single pustule or migratory pustule or a beginning infection of a broken efflorescence will demand more heroic measures. Here the indication seems to me to be some antiseptic, mildly caustic, strongly germicidal, but not destructive to corneal stroma. A fine round toothpick point wound with only a few cotton fibers and saturated in bichloride 1-500, the excess having been pressed off on the side of the bottle, may be applied to the pustule or infected efflorescence as often as once a day if necessary, and without a great deal of irritation and without any loss of corneal substance. In this type of case, many strong caustics have been advocated, as: carbolic acid, nitric acid, tincture of iodine and the actual cautery; but unless the infection is an unusually virulent one, the indication for such treatment would be very rare indeed.

In subacute cases where the body of the efflorescence has disappeared and the base only remains, or where a fairly active process has attacked the stroma, or a slight nebula or opacity is latent, many drugs and measures have been resorted to in the attempt to clear the pupillary region. Of these a solution of dionin in the strength of 3 per cent to 10 per cent is the favorite. Also the yellow oxide of mercury (of petrolatum alba) with gentle massage of the lids is useful. The result is probably more satisfactory when dionin is alternated with yellow oxide every few days, since an eye quickly becomes accustomed to either drug. Of special value in such conditions is the bathing of the eyes with warm normal salt solution for 15 to 20 minutes four times a day. My experience with a salt solution stronger than normal has been that it is burning and disagreeable to the patient, is irritating and has no added advantage so far as I have noted. While on the other hand the normal salt bathing is mild and nourishing to the cornea and undoubtedly efficacious.

The surgical treatment of phlyctenular conjunctivitis is limited. Cauterization of phlyctenular pannus with the active or caustic cautery is sometimes used, but rarely. In extensive vascularization of the cornea peritomy may be employed and with success. In minor cases splitting the vessel wall along its entire course with a sharp spud or fine point of a cataract knife will often obliterate the vessel, fibrous tissue contraction takes place, and elsewhere direct the stream of blood.

A very helpful surgical procedure is the removal of the contents of a sluggish or indolent pustule or efflorescence that has failed to improve under proper management. If necessary, ether may be given in such a case in order that the eye may be under perfect control. A fine blunt spud is to be preferred in such a case. Following this, an application of bichloride, 1-500, on a fine cotton swab will serve as a splendid non-destructive antiseptic, as well as stimulate the part to repair.

As for the operation of canthotomy or canthoplasty at any stage of this disease, it is barbaric and ancient, and a procedure entirely unnecessary and unwarranted.

In Conclusion.

1. The Etiology of phlyctenular conjunctivitis covers a broad field of medicine. It is therefore the more incumbent upon the physician, general practitioner and specialist to make a study of the individual case.

2. The Course of the disease may be an indication of the general physical condition of the patient.

3. A Differential Diagnosis through thorough examination is expedient and imperative.

4. On close inspection of the facts, the sequellae of phlyctenular conjunctivitis and its complications are far-reaching in importance.

5. Care is the keynote to the proper management and treatment of these cases.

6. The careful management of phlyctenular conjunctivitis is the profession's obligation in the struggle for the conservation of useful vision. Ophthalmia neonatorum and adult ophthalmia, destructive injuries and many foreign bodies in the globe, deeply imbedded foreign bodies on the pupillary area of the cornea, many cases of interstitial keratitis, malignant myopia, optic nerve atrophy, high refractive errors and many congenital abnormalities, are conditions over which the physician may have little or no control, although he may use correct judgment, give his utmost attention to diagnosis and treatment and display the most precise operative skill. But

phlyctenular conjunctivitis, per se. is an open field to a great extent, and demands only the early care and attention of the physician, and his recognition of the seriousness of complications that may be impending. In the control of phlyctenular conjunctivitis, no new theory as to etiology is necessary; no different course than is usual is to be anticipated, no extraordinary complication or sequel can be noted not already common knowledge, and no startling outline of treatment or specific drug can be recommended as a cure. Therefore, again allow me to insist that these cases demand only the care and attention of the physician.

One can aid in the conservation of vision by proper refraction, by diligent prophylaxis and treatment of ophthalmia purulenta, by skillful surgery in cases of injury and penetrating foreign bodies, etc., etc.. and wonderful improvements have been made in treatment and methods and wonders accomplished because of the immediate recognition of the danger of these conditions. But is the danger of phlyctenular conjunctivitis similarly recognized? It is unnecessary to answer. And yet, every oculist could report innumerable cases in his personal experience of vision totally or partially destroyed through pure neglect on the part of ignorant and helpless parents, or through a physician's carelessness and thoughtlessness in appreciating the seriousness of this disease and its complications. There are, of course, phlyctenular cases of a purulent, pustular or malignant type with extremely low resistance from physical debilitation and in which the most careful and conscientious attention may be unsuccessful in completely restoring to the normal condition; but on the other hand, the great majority, nearly all, of the typical phlyctenular cases should and can be checked in their course and normal vision be preserved.

If I have by this effort impressed upon him who may read this that a superficial phlyctenule of the bulbar conjunctiva is of importance to that patient; that a marginal phlyctenule is of great importance to that patient; and that a phlyctenule (not pustule or ulcer as yet) of central location, may be of the *greatest* importance to that patient, though the results of its effect may be years hence in determining the usefulness or uselessness of this patient's sight and life, I shall feel that something at least has been accomplished for the conservation of vision.

OCULAR ROTATIONS.

BY FRANCIS VALK, M. D., NEW YORK.

It has seemed to the writer that a study of the rotation of the eyes may be useful in the examination of heterophoria and heterotropia; and to offer some testimony along those lines, I repeat the following words that seem to have a decided negative answer, while I prefer just as decided an affirmative answer. But I will quote:

"For this reason (that is the action of all the muscles in convergence) the readings of the Tropometer are often misleading, and do not indicate the set of muscles at fault in heterophoria. For example. external rotation is recorded as 10 degrees less than the normal average (that is to say 40 degrees), and internal rotation is 10 degrees more (that is to say 65 degrees). Does this reading show that divergence is too weak or convergence too strong? Either one or both may be present. The instrument records the esophoria just as the Maddox Rod. the cobalt glass or other tests, but does not demonstrate weakness or strength, and practically is valueless in accurately indicating the muscles primarily affected. or when operation is indicated. the muscles to be advanced or tenotomized."

The above quotation—except for the words in parenthesis—is taken from Dr. H. F. Hansell's article in Ophthalmology—January. 1914—and seems to be so positive in its assertion that I feel compelled to ask myself. what is the Tropometer good for? If it is useless, let us so understand it. and place it on the top shelf of our closet and let it rest. But I do not feel that it is useless by any degree and as Reber has well said. it must be used in all examinations for heterophoria and heterotropia. Now I would like to take some space in a short discussion of this instrument—because. for some reason. it has not met with the approval of the profession. which it deserves. and perhaps because its limitations and its indications are not fully understood—at least I may say—as I understand them. To say that its readings are "misleading" may be true: but why? And does the instrument indicate any "set of muscles at fault in heterophoria?"

To the first question I must at once give a negative answer. They are not misleading: and to the second question an affirmative answer. It does indicate our procedure in the muscles at fault. Furthermore, we find an example of rotation given—inward 65 degrees, outward 40 degrees—and when asked if this reading has any indication of divergence or convergence—certainly not. The instrument does not indicate the power of divergence or of convergence any more than a prism base out over one eye would indicate convergence. A person may only overcome an adducting prism of 20 degrees, and yet converge the eyes to within a few inches of the nose, and consequently for that purpose it is "misleading." Again I find the instrument compared with the Maddox Rod, cover test, etc. Yet I think I can affirm that the Maddox Rod test is purely subjective, and is useless with children, but that the findings of the Tropometer are purely objective in both adults and children, and the preference for an objective examination in all ocular conditions goes without saying or argument. Let us again consider the last two propositions of the above quotation. It "does not demonstrate weakness or strength" and "is useless in accurately indicating the muscles primarily affected, or when operation is indicated, the muscles to be advanced or tenotomized."

To the first assertion I must positively state it does demonstrate weakness or strength, but not of convergence or divergence; and to the second assertion, it is of very practical value in indicating the muscles primarily affected and the operation to be performed. In all examinations for heterophoria, and the indications for any interference with that condition, we must remember that the final result is simply one of degree. That is to say, it is I think, once established, that in all heterophoria of low degree, we may ignore the motor imbalance and, correcting the refractive condition, we will relieve the symptoms though the heterophoria remains. But when we find the abnormal condition to be three or more degrees, we then come to the field of rotation, in which we must take into consideration this imbalance, and use every means to prove the condition and seek every indication for a correct operative procedure. It is at this state of our scientific examination that, in the work of the writer, the Tropometer has been a most useful instrument. For illustration, we have a well marked case of esophoria of four degrees as shown by Maddox Rod, etc. We have exhausted all other means of relief, glasses, exercise, etc., without benefit; prisms are useless in these cases, what next? Operation. What operation, and which eye?

These are the questions that Hansell's article does not answer. Let us see if the Tropometer will answer them. It is not a question of divergence or of convergence. The diagnosis tells us we have a tendency of the eyes, one or both, to turn inward to an abnormal degree. But is it one or both? Now we will take the findings of the Tropometer often shown in a well-marked case with this result—upward 33 degrees, downward 55 degrees. This shows certainly no vertical tendency according to the standard rotation; but we also find inward rotation 60 degrees and outward rotation 40 degrees. Does not this prove objectively simple esophoria? Furthermore, it is seldom that we find this rotation equal in each eye, and now our examination shows—R. E. inward 55 degrees, outward 45 degrees; L. E. inward 60 degrees, outward 40 degrees. Does not this indicate that the tendency to esophoria is in the left eye? But you may say this does not indicate strength of the internus or weakness of the externus. Very true; yet I think, if it comes to a question of an operation, our decision should be at once, to make a weak condition stronger, not to make a strong condition weaker; and so the indication becomes very clear for an operation on the left externus by a shortening or advancement as the surgeon may prefer. Are these words valueless in accurately indicating the muscles primarily affected, and is not the operation indicated? The same rule will apply in a case of exophoria and does not need any explanation here.

In conclusion, I would refer to those anomalous cases expressed in my article on dextrophoria, when this condition is found to complicate either esophoria or exophoria. Here we have the indication for an operation very imperative, and in which we may easily "operate on the wrong eye" with complete failure. In other words, in dextrophoria an advancement of the right externus in esophoria would be of no benefit; or an advancement of the internus of the left eye in exophoria would meet the same failure; while, per contra, an advancement of the left externus in esophoria or an advancement of the right internus in exophoria would promise success.

Since writing the above the following case was examined in my office: Mrs. M., aged 25, says she had "crossed eyes" when a child and has complained of all the symptoms of motor asthenopia since. Under the care of several oculists, with the use of glasses and prisms without relief. Has 1.50 D. of simple hyperopia, no astigmatism. Maddox Rod shows 6° exophoria, purely subjective. Her duction tests finally show adduction 30° and abduction 10°, falling to 3° after testing the interni, and now the rod test shows esophoria 3°. Now we have the findings of the Tropometer. This shows no vertical tendency, but R. E. 60° inward, 50° outward, and L. E. 55° inward, and 50° outward. It seems to me that these figures speak for themselves, and though the rod did show 6° of exophoria I think I can confidently state that this is a case of esophoria and that the only operation indicated would be a shortening of the right externus.

Finally, in heterotropia, the indications of the Tropometer will, in my opinion, give success in all operations for convergent or divergent squint, and it seems to me that the investigations of Lauder, Reber and others must prove the usefulness of this invaluable instrument, the Tropometer. I have in preparation a paper to more fully prove the worth of this examination of the rotation of the eyes in all cases of imbalance or strabismus.

SOME POINTS RELATIVE TO ENUCLEATION OF THE EYEBALL AND SYMPATHETIC INFLAMMATION.

BY E. R. CARPENTER, M. D., EL PASO, TEX.

Most eyeballs are enucleated on account of some form of injury due to accident, or from infection, the removal being in most cases hastened by the fear of sympathetic inflammation.

The enucleation of an eyeball is not a difficult procedure, consequently it is not always done by an oculist. The results of the operation are almost uniformly good, in so far as the field of operation is concerned. The question as to whether an eye should be removed or not is in certain cases a very grave one, requiring prompt, well founded judgment. Statistics show that numerous cases are on record where the injured eye with but little vision, in time became the only source of sight, while in other cases it is beyond a doubt that had enucleation been made at the proper time, no disturbance of vision would have occurred to the sound eye.

In tumor of the eye ball, in badly injured eyes with loss of vision, and in totally blind eyes with chronic tenderness and irritation, there is usually not much question as to the advisability of interference. The method of removal is at times of importance in this class of patients, not only for the relief of the unhealthful condition, but for cosmetic purposes.

Usually an eye infected with the ordinary pus germs, either from unknown sources or from non-penetrating injury, is not considered dangerous to the other eye, even where extensive damage is done; neither is panophthalmitis or gonorrhea feared to any great extent, nor does a shrunken atrophic eye from these conditions but seldom involve the other eye as a secondary ophthalmia.

The shrunken blind eye which at times follows the above conditions, may become irritable and a nuisance to the patient, necessitating some operative procedure for comfort. In any of the above conditions, either in the acute or later stages, we may meet with a sympathetic *irritation* in the sound eye, which is not serious, and should never be confused with sympathetic *inflammation*, which is one of the stumbling blocks for the ophthalmologist. This non-purulent low grade inflammation involves the interior of the eye ball, attacking one or more of the structures, leading in most cases to blindness and is supposed to originate from an unknown infectious organism introduced into the injured eye by a foreign body, or that this organism is circulating in the fluids of the body and becomes active in the eye tissues that have been injured, and is transferred secondarily days, weeks, months or years later to the well eye.

Another theory is that the infectious material travels along the sheath of the optic nerve, from the injured eye to the sound eye, however this has never been verified sufficiently to have much weight.

The claims that the ciliary nerve endings are reflexly responsible for the secondary manifestation, more probably explain the sympathetic irritation so often met with in every day conditions of the eye.

Batteri, Weigetin, Kitamura and very recently, Mueller of Vienna, have reported cases of spontaneous sympathetic inflammation in which the patients had never had an injury to either eye, thus confuting the usual claim that this trouble follows in the wake of a penetrating injury to the eye ball. No doubt there are other cases similar to these, which have not been properly diagnosed.

The infectious nature of this disease becomes more apparent when we consider the similarity between this trouble and certain well known chronic infectious diseases, which at times involve the eyes and ears. For instance, syphilis, tuberculosis, rheumatism, etc., frequently cause trouble in an eye or ear, and we are usually quite confident that the other member will in time be involved. Unquestionably, in many of these cases it is the toxines or by-products of the infection eliminated from other sources into the circulation, that cause trouble in the eye and ear. It is also very probable that other diseases whose causes are unknown, yet follow a similar course, as otosclerosis, glaucoma, certain forms of choroiditis, etc., are all due to toxines or by-products in some form, perhaps in the nature of an indefinite toxemia, or from malfunction of certain glands.

Other factors indicating that sympathetic inflammation is most likely of infectious origin, may be noted as follows:

(1) The symptoms of the disease and the similarity of the pathological findings which are of a granulomatous nature, are invariably present in the injured and in the sympathizing eye.

(2) Sympathetic inflammation occurs most frequently in eyes that have been injured where the uveal tract was penetrated and the eye ball was not enucleated, indicating that the nutritive media was rendered favorable by some action of the injury. Either the infecting material was from without or circulating in the blood.

(3) Apparently identical lesions in several hundred injured eyes may not produce more than one or two cases of sympathetic inflammation. Many ophthalmologists have never seen a patient with this trouble.

(4) Rare cases show that no injury is absolutely necessary, but that one eye becomes involved first and the course is practically the same as in injury, except enucleation of the primary eye is not so favorable as in injury.

(5) Enucleation of the injured eye usually gives excellent results if done early or before the sound eye is invaded while it is of practically no value if done late.

(6) Mercury, salicylates and salvarsan have a very favorable influence on some cases.

Since the greater number of eyes that are enucleated are removed from fear of this disease, and as it is comparatively rare, and as there are absolutely no indications as to what eyes it may develop in, is it not probable that many eyes are sacrificed that might otherwise be of some value, or at least could not better cosmetic results frequently be obtained, especially in children, and more especially in girls? Where close observation can be had, if an injured or blind eye is not doing satisfactorily after a reasonable time, and there are no positive sympathetic inflammatory symptoms, it is not ordinarily assuming any great responsibility to use some substitute for complete enucleation. It is surprising how many injured and infected eyes shrink and present the atrophic condition without any apparent trouble, in patients who have never had any medical attention. I am not advocating that this be done by physicians in all cases, but I do believe more conservative methods would in many cases be justified as the improved appearance would well outweigh the risk involved.

The cosmetic effect in eye work is today receiving much more attention by leading ophthalmologists, especially in private practice, than formerly. Various substitutes for complete enucleation have been introduced or resurrected. Many operators employ what is known as Mules' operation, that is, removing the cornea and thoroughly curetting out the contents of the eye ball, and placing therein a sterile gold, glass or celluloid ball, then suturing the sclera and conjunctiva together over it. Some remove the sclera and put the ball or a piece of fat in Tenon's capsule, then suture as before. Where the foreign substance is retained, a very natural effect is secured by aid of the artificial shell.

Another method that certainly assists much in the movements and natural appearance, is known as evisceration, whereby the cornea and contents of the eye ball are removed, the lining of the sclera being mopped out with pure carbolic acid and the walls of the sclera sutured together, thereby giving more body to the stump and a better attachment for the muscles. Some claim that the sclera atrophies and disappears altogether, and that the danger of sympathetic inflammation is much greater than with enucleation. Enucleation of this stump can be made at any time if any indication of serious trouble arises. At any rate, in my experience the effect of this operation is far better than complete enucleation.

Enucleation is no doubt the absolutely safest method in all cases, but in the light of our present knowledge of sympathetic inflammation this argument is somewhat akin to amputating every arm that has an infected finger, for fear of losing a life.

BINOCULAR VISION AND THE OPTIC CHIASM.

A Reply to "The Prism-Dioptry Establishes a Dimensional Unit at the Optic Chiasm," by C. F. Prentice.

BY A. T. POFFENBERGER, JR., PH. D., COLUMBIA UNIVERSITY.

The "disclosure" which is made by Mr. Prentice in a recent issue of this journal[1] in regard to "the acuteness of visual discrimination at the optic chiasm," and also the editorial note which precedes the article, deserves some consideration.

The basis of this disclosure is the assumption of a "chiasmal image," or its equivalent in terms of "optic nerve fibrils within the cross sectional and comparatively small area of the optic chiasm." This chiasmal image, being a compound produced by the overlapping of the two images (or their equivalents) which are formed upon the two retinas, is said to provide the physical basis for binocular vision. The author says, however, that the chiasmal image is *figurative* and "not intended to convey the idea that an image in its strictest sense is located at the optic commissure." Now the use of such a figurative expression can do no harm if its figurative character is kept in mind. But the editorial note suggests that the above qualification may not be clearly apprehended, for it speaks of the "hypothesis of a chiasmal image" and of its possible acceptance (presumably as true). It states further that the difficulties of conceiving of such an image are "by no means insurmountable," also that "as there is no valid reason why one should not conceive of image formation at any point along the optic radiational lines, the concept of a conjoint image within the chiasm is not only a thinkable but may be a useful idea."

Our contention is that the conception of a chiasmal image is beset with insurmountable difficulties and is unthinkable, according to any generally accepted definition of image, physical or mental. The image formed by the rays of light is a construction which is in conformity with the laws of physics. The immediate effect of the light rays is to set up a photo-chemical process in the retina, which in turn gives rise to the nerve impulse. Now the most recent researches into the nature of the nerve impulse[2] tend to show that it is more and more like the electric current that passes over an electric cable. Moreover, the most common conception of such a nerve trunk as the optic nerve is that it is made up of a series of separate nerve fibers each insulated from the others by its appropriate sheaths, just as separate wires in a cable are insulated from each other. The impulses traveling over these fibers are simple currents and have no resemblance to the mental phenomena which shall be aroused when these stimuli act upon their appropriate centers in the brain (whether they be the lateral geniculate bodies or the occipital lobes makes no difference). Nor do they have any resemblance to the physical light stimuli that caused them. Therefore it seems impossible to conceive of an image of any kind being located at any cross section whatever of the optic nerves.

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[1] February, 1914.

Granting that "chiasmal image" is a figurative expression, let us examine the physiological or anatomical structure which it is intended to represent. "It shall signify that orderly assemblage of the optic nerve fibrils within the cross-sectional and comparatively small area of the optic chiasm which receive their individual stimuli from corresponding points in each retinal image." This statement is not qualified as figurative. One finds the following statement somewhat later: "However. as this must remain a matter of pure conjecture." But we understand this statement to refer to the sentence immediately preceding. in regard to the relative size of the retinal and chiasmal images. and not to the arrangement of the fibrils in the chiasm. The histological examination of the optic chiasm reveals no such orderly arrangement of its fibers. On the contrary. one gets the impression of complete disorder as the fibers cross from one side to the other. except for the general movement of fibers leading from the left half of the right retina over to the left side by way of the chiasm. and the opposite movement for fibers leading from the right half of the left retina. The juxtaposition in the chiasm of fibers leading from identical points on the two retinas is not indicated by present knowledge of the histological structure of the chiasm.

But assuming that such relation between fibers leading from identical points can be found, it would still offer no explanation of the fusion of the retinal images. For as we have stated above, since the fibrils are separated from each other by an insulating medium, currents passing over them would be equally distinct whether the fibers were side by side or at opposite sides of the chiasm. The arrangement of the fibers in the chiasm could be no more significant for the perception which is to result than the arrangement of the wires at any point in a telegraph cable would indicate the relative destinations of the numerous messages which they carry.

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[2] We have in mind some work. as yet unpublished. which has just been completed at the College of Physicians and Surgeons of Columbia University. New York. However, earlier work shows the same tendency.

Let us assume for a moment that the location in the chiasm is of significance and that perfect binocular vision does depend on the exact symmetrical arrangement of the retinal fibers in the chiasm. Then when fibers leading from identical points are not in juxtaposition, or when fibers that do not lead from identical points are in juxtaposition, diplopia varying in degree will result. It would then be interesting to speculate as to what kind of vision those animals would possess which have a chiasm, but whose eyes are placed on the side of their head, and for whom binocular vision would be impossible. In such animals all the optic fibers would cross to the opposite side in the chiasm. Surely, in this case the arrangement of the fibers in the chiasm could give the basis for only the most blurred and confused images, since in every case, those fibers would lie together which represent totally different retinal points. Or we might ask what kind of vision those animals would possess, which have binocular vision in only a part of their field. Unless one believes that the chiasmal image or its anatomical correlate is something peculiar to man—and surely no one could believe that—the conception of the value of exact arrangement of the fibers in the chiasm must lose its force.

If the conception of the orderly arrangement of the nerve fibrils is, like the chiasmal image, only a figurative expression, intended to make the theory of identical points clear, then it must be proven to be of more value than any other means of representing the same facts. Take the following quotation from Titchener's Textbook of Psychology (1911, p. 309): "Think of the two retinas as slipped, the one over the other, and as held together by a pin driven through the superimposed foveas. The two pin holes then represent corresponding points, the retinal points stimulated by the point in objective space which the eyes, at any given moment, are fixating. Let other pins be driven vertically through the two retinas, at any points round about the fovea: in the rough, every pair of holes will represent a pair of corresponding points. Now, it is clear, if you work the matter out by help of diagrams, that when the eyes are in a certain fixed position, only a certain number of the points in objective space can be imaged upon corresponding points." Now since the size of the chiasmal image must, according to Mr. Prentice, "ever remain a matter of pure conjecture," with the result that the images must be represented in their true retinal size, why not construct the diagrams directly from the retinal images, as suggested by Titchener, and thus escape the more cumbersome assumptions concerning the optic chiasm. The diagrams given by Mr. Prentice are just as useful, when recognized as entirely artificial, as when they are based upon the assumptions of chiasmal images or their anatomical equivalents.

Quoting again from Mr. Prentice's article (p. 2): "With this conception of the chiasmal image, orthoscopic binocular vision may be said to require absolute equality in the dimensions of the retinal images, in order that these identical retinal images, when conveyed by the optic nerves, may exactly cover each other at the optic chiasm. In other words, the axial image points . . . . being separately transmitted by their respective optic nerve fibrils, must exactly cover each other at the center of the chiasmal image." This statement implies the acceptance of the theory of corresponding points in its strictest sense. The theory in this form was held by Newton and others, upon the supposition that the nerves conducting the impressions of corresponding points unite, on their way to the chiasm, into one which conducts the impression to the brain. The only real anatomical evidence was the observation of the semi-decussation of the optic nerves and the consequent relation between the occipital lobes and the retinas. But immediately after the invention of the stereoscope and the artificial production of relief, it became necessary to modify or reject the theory of identical points. For the stereoscope proved that objects may be seen as single, when the images are not formed on corresponding points.

Let us see what the current opinion is in regard to the theory of corresponding points. We will quote again from Titchener.[3] "Suppose, now, that the images of some object in external space fall upon retinal points that *are almost, but not quite, in correspondence. The object is seen as single;* for the corresponding points are not points in the mathematical sense: a point on the one retina corresponds to a small area on the other. Suppose, again, that the images fall on retinal points that *are just a little further removed from correspondence. The object is still seen as single,* but it is now seen as extended in the third dimension. That is to say, tri-dimensional vision, the vision of the object as solid, is a sort of half-way house between single and double vision; to see a thing solid is a compromise between seeing it as spatially one and see it as spatially two."

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[3] Textbook of Psychology, 1911, p. 310 ff. The italics in every case are ours. As the statements contained in the above quotation are so generally accepted, we have not given the original references. They may be found at the close of the chapter from which the quotation is taken.

"But why should the combination of disparate retinal images take place at all? Why should not disparity of images mean, at once and always, that we see the object double? These are difficult questions, and we can no more answer them, in any ultimate sense, than we can say, for instance, why light of a certain wave length is seen as red and not as blue." The difficulty of these questions has caused some investigators to propose other theories and to discard the theory of corresponding points altogether. Of particular interest in this connection is the theory of Javal,[4] which calls especially for two factors in binocular vision, neutralization or partial suppression of one of the images, and the influence of ocular movements. It is not proposed here to go into a discussion of the theories, but merely to say that if one accepts the general principle of corresponding points, he must be willing to enlarge the points into areas of indeterminate size. Such a change would destroy the exact correspondence required for the functioning of the chiasmal images. A number of elaborate experiments[5] have shown that there is no definite center of fixation, but that there is a somewhat extended area of fixation in each eye, which is entirely satisfactory to the subject (person) as far as binocular fusion is concerned.

Therefore it is evident that perfect binocular vision does not depend upon the point for point correspondence of the visual images or their anatomical equivalents in the chiasm, but that a certain deviation from this correspondence is quite consistent with normal binocular vision.

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[4] See Tscherning. Physiologic Optics (trans.), 1904, p. 326 ff.

[5] The following are a few of these experiments: C. H. Judd, Records of Convergence and Divergence, Psych. Rev. Mon. Supp. Vol. 8, 1907; W. F. Dearborn, The Psychology of Reading, Archives of Psychology, No. 4, 1906; Raymond Dodge, An Experimental Study of Visual Fixation, Psych. Rev. Mon. Supp. Vol. 8, 1907; C. N. McAllister, The Fixation of Points in the Visual Field, Psych. Rev. Mon. Supp. Vol. 7, 1905.

The conclusion to be drawn is as follows: "Chiasmal image" can be only a figurative expression, while its supposed anatomical and physiological conditions are not verified by histological examination of the chiasm. Further, if such anatomical structure were found in the chiasm, it could have nothing to do with the perception of objects as a result of the functioning of the two eyes. If we assume that binocular vision does depend somehow on the assemblage of fibrils in the chiasm, we would be confronted with the task of explaining the vision of animals whose visual fields are quite separate or partly so, but which still have the chiasm. If, now, the orderly assemblage of fibrils in the chiasm be considered merely as a figurative construction for clearness of exposition, it offers no advantages over the diagrammatic figures based directly upon the retinal images, which require no other assumption than that of corresponding points in the two retinas. Finally, the very assumption of corresponding points has had to undergo revision, with the result that the points have become areas of indefinite extent. Therefore, the exact covering of one point in one image by the corresponding point in the other image at the optic chiasm (which is the assumption of the chiasmal image) is no longer of value either as a working hypothesis or as a figure of speech.

A new journal of very great interest to ophthalmologists is the "Zentralblatt für die Gesamte Ophthalmologie und Ihre Grenzgebiete," edited by Bielschowsky, Elschnig, Hertel, von Hippel, Schick, and Siegrist. The journal will be issued every two weeks. The contents are grouped under three headings, dealing with 1, general topics; 2, special ophthalmologic topics; and 3, borderline topics. Each issue will constitute a review of current literature published since the next preceding issue, thus furnishing a year-book which is always up to date. The subscription is approximately $12.50 per year. Richter and Co. of Milwaukee are the American agents for the publishers.

REPORTS OF SOCIETIES

CHICAGO OPHTHALMOLOGICAL SOCIETY.

A regular meeting was held February 16, 1914 with the President, Dr. Wesley Hamilton Peck, in the Chair.

Partial Albinism; Eyes Only Affected.

Dr. W. E. Gamble reported a case of partial albinism of the eye without involvement of the hair or skin. He first saw the patient at eight months of age, at which time patient seemed to be blind. There was sufficient pigmentation of the irides to give to the casual observer the suggestion of brownish color. Lateral nystagmus is present. The hair, when first seen, was light brown; now it is quite dark. When sixteen months old his error of refraction—hypermetropia, was corrected and the lenses ground from number 3 London smoked glass. His vision has gradually improved so that now, at twenty-seven months, he plays with small objects and with other children. Judging from the darker color of the iris at the present time, he has no doubt that this improvement is partly due to gradual deposit of pigment since birth.

Retinitis Pigmentosa.

Dr. W. E. Gamble reported the case of Mrs. H., 27 years of age, with retinitis pigmentosa. Her father and his brother and sister are both victims of the same disease. The grandfather of Mrs. H. married his first cousin, and the father of Mrs. H. married his first cousin.

His reason for presenting these cases is that in America it is rare to see two generations having the disease and having a clear history of consanguineous marriage. In the isolated mountain districts of southern Europe this condition is not so uncommon.

It is sometimes very difficult to distinguish widely diffused superficial choroiditis, with pigmentation of the retina and atrophy of the disc, from this disease.

The history of syphilitic retino-choroiditis with pigmentation of the retina and atrophy of the disc along with atrophic choroidal patches and pigment under the retinal vessels clears the diagnosis.

DISCUSSION.—Dr. J. E. Colburn said he failed to note in Dr. Gamble's report of albinos whether there was an aberration of the color sense. In a series of cases he followed some years ago, and in two that he had seen occasionally for twenty years, when they came to him they were children, brother and sister, with complete albinism. They darkened a little as they grew older, but they had absolutely no color sense. With the worsteds they would pick out the colors as to color value, and classify them, but they had no sense of color perception. This had been maintained for the last fifteen or sixteen years. They had not improved in their color vision. With them he used a very dark fenestrated glass, and their refraction was put into a small opening so that they have been able to read and use the eyes with comfort. Vision was very good: they had very little nystagmus, he thought none at all in their later life. After they had worn correction for a number of years the nystagmus they had slightly in childhood disappeared.

In the other cases in which there was partial albinism they were absolutely blind to green, but with blue or yellow, or the combinations of blue or yellow, or the combinations of red or black or the grays, they had very good color perception. In a more recent case he found absolutely accurate color perception; vision was a little low, but not materially so. Nystagmus is usually present, but not necessarily so.

Consanguinity he thinks holds in albinism as well as it does in the opposite condition. He gathered fifteen cases, and in eight of the fifteen there was infant consanguinity, and three cases dated back to two generations, the first albinism occurring in two generations prior to the one he saw.

An Anomalous Nerve Head with Good Vision.

Dr. Michael Goldenburg reported the case of a male negro aged 19, in which there was an apparent absence of both discs, with marked pigmentation in the region of the nerve head. The fields of vision for color and objects were very irregular, while the acuity of vision was almost normal. There was a history of eye trouble for the past six years, consisting largely in inability to read for any length of time without pain and excessive lacrimation. About five years ago the patient had glasses fitted by an optician. Examination of the eyes last October disclosed an alternating squint present with the right acting as the fixing eye, although vision was better in the left. Patient is able at this time to see with his right eye 20/50 and with his correction 20/25.2. The tension, cornea, anterior chamber, pupillary reaction are all negative. The iris is heavily pigmented and dilates perfectly. The lens and vitreous are also negative. Examination of the fundus reveals the following anomaly; an attempt to locate the disc as a preliminary step to a more detailed examination proved futile. Tracing the vessels from the periphery to the point of convergence did not seem to help in locating anything that might resemble a disc. However, at the point where the vessels apparently come together, and where the nerve head should be, a very small intensely white spot was found. This spot could not be defined. The vessels appeared negative in every respect. The retina is normal with the exception of a marked pigmentation in the region of the nerve head, but gradually assumes a lighter shade toward the periphery. The fields of vision are not markedly contracted, but the marginal lines appear serrated in outline.

DISCUSSION.—Dr. Clark W. Hawley spoke of a case he exhibited before the society a number of years ago. There are one or two differences between the case of Dr. Goldenburg and his, in that there was almost no pigmentation at the disc. The blood vessels seem to come out more as in the normal disc. Around the blood vessels the retina seems to be somewhat darker than the rest of the fundus. In one eye of this patient there was a streak which looked like a hyaloid membrane. Vision was fairly good. There was some discussion at the time he exhibited the case as to whether it might be one of optic neuritis. A very careful examination of the case a number of times did not disclose anything which would point to an optic neuritis. In his case there was an absence of the disc. In Dr. Goldenburg's case the pigmentation he thought would indicate the formation of a disc with the pigment on top of it, but in his own case it was almost nil.

Dr. Thomas Faith said that several years ago he reported in the OPHTHALMIC RECORD two or three cases similar to the case reported by Dr. Goldenburg. There was no pigmentation, but he thought it was proper to classify it under absence of the disc. The cases resembled very closely those of optic neuritis; the disc was swollen, and there was a difference of three or four diopters between the summit of the nerve head and the surrounding fundus. One of the cases had a vision of six-sixths (6/6) in one eye, and less than that in the other. He did not remember the details but in all cases he was able to watch for many months he was satisfied he had a congenital anomaly to deal with. Taking the field a number of times showed a slight variation. There was no enlargement of the normal blind spot, and no evidences of inflammation, exudation, or hemorrhage in the retina or nerve head. One of the cases he has been able to see within the last few months and the condition is identical with what it was a number of years ago. In the myopic case the myopia had progressed some. There was three-quarters of a diopter more of myopia than there was when he reported the case, yet there is no evidence of change at the margin of the disc.

Dr. Faith referred to other cases in the literature on this subject.

Dr. Goldenburg, in closing the discussion, stated that in the Ophthalmic Record for 1901 he saw a report of Dr. Hawley's case; that vision was bad and no improvement with glasses. The report at that time was incomplete and he could not get much information out of it. Dr. E. V. L. Brown in discussing the case was unable to find any evidence of the disc, but the vitreous changed quite a bit. He thought there were the remains of the vitreo-glial structure. As to the absence of the disc, he assumed the attitude of an embryo ophthalmologist when he said it was hardly possible to have absence of the optic disc with vision. There was a case in an adult of absence of the optic disc, but he was totally blind.

In regard to his own case he was in hopes someone would tell him something about the fields and clear up the point of how we were able to account for these constricted fields and serrated edges of the outline.

The Intra-Capsular Cataract Operation in Immature Cataract.

Dr. William A. Fisher pointed out two serious objections to the intra-capsular operation: first, the want of an experienced assistant, and, second, the great danger of the loss of vitreous. These two objections could be overcome, and he mentioned a plan of eliminating both of them, or at least robbing them of most of their dangers. The want of a properly trained assistant has always been considered sufficient cause to deter many good operators from attempting the intra-capsular operation. He does not underestimate the value of a good assistant, but he thinks his double lid hook will simplify the assistant's part of the operation, and Colonel Smith believes with him that an assistant can be trained with this instrument in a comparatively short time to successfully care for the lids. With the proper assistant some operators might be bold enough to attempt the removal of a lens in its capsule. However, even if a skillful operator with a good assistant attempted the removal of a lens in its capsule before he knew how to introduce the Smith spoon in impending or actual loss of vitreous, he would soon meet with disaster.

It is not a difficult matter after cocainization of the patient or a number of them to become familiar with the lid hook, not only holding the lid away from the eye when expelling the lens, but also during the incision and the iridectomy. There are only two positions in which the lid should be held and they should be thoroughly mastered by both operator and assistant before beginning so important an operation as the removal of the lens by any method.

There are many eye specula that will hold the lids open in a proper manner when the patient is not nervous or made so by a little pain, but no one can tell when a patient is going to squeeze his lids and make pressure upon the eye ball. If a surgeon must use an eye speculum to make the incision he should not use one while the lens is being delivered. If specula must be abandoned for the delivery of lens, the author believes they should not be used at all during any part of the cataract operation. He has not used an eye speculum when operating for cataract for the past ten years.

The Smith spoon is not as easily placed behind the lens with the left hand as some may believe, but it is possible to get this technic by operating upon animals' eyes. After a very large experience with the intra-capsular operation there was one thing he feared when he left India and that was the introduction of the spoon to deliver the lens in impending or actual loss of vitreous. He operated upon more than 100 eyes before he was permitted to use the spoon, and after that the loss of vitreous was not great enough for him to become proficient in the use of the instrument. When he returned to Chicago he made himself familiar with the introduction of the Smith spoon by practice on pig's eyes placed in a mask. The more skillful the operator in delivering the lens, the less often will he be called upon to use the spoon, but he must be prepared to use it at any time.

Dr. Fisher then described the method for operating on cataracts.

As to iridectomy, the method employed by Smith is not as simple as it appears, but any good operator should be able to do it with a little experience. It is not usually necessary to introduce the iris forceps into the eye, and if the ophthalmic surgeon insists in putting the iris forceps into the eye he will will be rewarded by some injured capsule which will prevent the removal of the lens in its capsule.

Some ophthalmic surgeons recommend preliminary iridectomy in certain cases, and he has in a previous paper recommended a preliminary iridectomy in all cases. Since his experience in India he feels that a preliminary iridectomy would be of advantage especially to those who do not operate frequently.

Experience can only teach one how much pressure to make in delivering the lens, but enough must be maintained to keep the corneal wound full of lens, otherwise vitreous will escape. The lens being partially expelled and hanging in the wound is extracted with the hook.

As to the toilet, the lid is held up and away from the eye by the double hook. The patient usually looks up, which position aids replacement of the iris. Should the patient not look up he will do so on request. It is not necessary but dangerous to have the patient look down after the incision has been made. The iris is tucked back into the edges of the corneal wound with the Smith spatula, and the eyes closed. Any clean dressing that suits the operator will be proper, but Smith prefers to cover both eyes with a light dressing after the lashes have been covered with yellow oxide of mercury, one grain to the ounce. Whatever dressing is used no pressure should be applied.

No matter what after treatment is followed, the result will usually be good if the operation has been performed without accident. The less after treatment the better. The dressing need not be removed for nine days unless the patient complains, and usually he is ready to be discharged at the first dressing.

Should an immature cataract be operated upon? If the objections to the removal of the lens in its capsule can be overcome, the author thinks there is no need in a patient with beginning cataract to wait for maturity.

How far can one go with safety? If the lens does not present when the operator thinks he has made a safe pressure he can abandon the intra-capsular operation and cut the capsule with a cystitome or capsule forceps and deliver in the old method with the new technic. He suggested the use of his capsule forceps if any are to be used, because they can be introduced without having the patient look down.

In the intra-capsular operation the lens can be removed as soon as the patient is unable to attend to his duties. The lens can be as easily removed at this time as any other, and he will be in better condition at this time than later.

Some ophthalmic surgeons, Dr. Fisher said, have an impression that Smith does all the intra-capsular operations that are done in India. This is far from correct, but he is the foremost man in India. In the Punjab where there are 20,000,000 inhabitants, there are about 25,000 cataract operations performed a year, and ninety per cent. of them are intra-capsular operations.

He believes that Smith's technic when used in the capsulotomy operation will do more for the cataract operation than all that has been done for it in the past one hundred years. If that technic is thoroughly mastered in the capsulotomy method a good operator will not have much difficulty in removing the lens in its capsule.

As a word of caution, he urged in closing that ophthalmic surgeons contemplating the removal of a lens in its capsule master the Smith technic and use it in their old operation and not attempt to remove a lens in its capsule until they have thoroughly mastered the Smith technic and have used it in many capsulotomy operations. If they do not adopt the intracapsular operation they will do better work by using Smith's technic in the capsulotomy operation.

DISCUSSION.—Dr. Derrick T. Vail., Cincinnati, Ohio, said he has entirely abandoned the technic of the old operation. He has not used a cystitome since his return from India four years ago. The cystitome is a poor instrument to use, not for what it does, but for what is does not do. He has scarcely any use for a discission needle. He extracts in the capsule whenever it is possible in his hands to do so. He described the operation as it is done by Smith. The incision Smith makes is the best incision for cataract that has ever been devised. The principle involved in brief is that of an angle-hinge to a trap door. The fine point of the knife punctures the cornea at right angles to the limbus. The narrow blade is then turned flat in the plane of the iris and made to pass slowly through the chamber, but on emerging at the oposite side, the edge is turned up again to come out at nearly right angles to the limbus and is then turned flat so that the edge, staying just within the cornea, severs it from the limbus with that one clean forward sweep. The effect of this technic was illustrated by diagram. Those two little angle cuts at the ends of the incision speak volumes for allowing space for lens emergence. Thus it is that Smith can cause an eye to disgorge a large lens through an apparently small incision with a minimum strain. The corneal incision opens, not like the jaws of a steel trap on its resisting hinge, but more like the jaws of a snake whose articulations yield unresistingly.

As for the lid hook, he always uses it in every cataract operation when delivering the lens and toileting the wound. As for the lens hook, he uses nothing else for delivering the lens. As for the lens spoon, it is a great instrument and works well.

Dr. Fisher's argument favoring operation on immature cataracts, he thought, is unassailable. Personally, he operates on every case, no matter what kind of a cataract it may be, if the vision is at best 20/70 or less. He likes to operate on these cases; he does not dread it at all. If vision is 20/70 or thereabouts, his patient is still in prime health. He can also dilate his pupil and study his fundus. It is a source of immense satisfaction to have seen the optic disc and macular region just before operating.

A faultless, skilled assistant is as essential as a good operator. The speaker's excuse for not delivering every case in the capsule is that he has not such an assistant as NUR ALI.

If Fisher's new lid hook will eliminate the danger of an untrained assistant, then he has conferred a priceless boon on Smith's intra-capsular operation, and he prays it may be so.

Dr. William L. Noble described at length the operation as he saw Dr. Fisher perform it. He could not agree with Dr. Fisher that it is unwise to introduce the iris forceps into the eye for fear of injuring the capsule. He could not see why there was any less risk in introducing one blade of the forceps into the eye over the iris, although one does not reach the pupillary margin of the iris, and the other blade outside of it and grasping the iris. The iridectomy was free. The operation as performed by Dr. Fisher, who had mastered the technic, was comparatively simple, although it involved the highest skill, in that he made no false motions. Every motion counted.

Everything said about the double hook is justified. It increases the simplicity of the work of the assistant. He believes it is a physical impossibility to do the operation as described by Dr. Fisher with any degree of assurance of success with the ordinary speculum. The constant, persistent pressure of separating the lids with speculum is always annoying to patients.

As to the difficulty of placing the spoon behind the lens where vitreous engages in the wound, he fails to see why it should be such a hard thing to do. He could see no difficulty of getting the spoon behind the lens when the vitreous has once appeared. The next time he operates for cataract he will disregard the use of the speculum and employ the lid retractor in its place.

Dr. H. H. Brown said the inflammatory involvements, the accidents from the immediate operation, and the necessity for secondary operations made those who are doing private practice feel as though they are woefully lacking in the results they are obtaining.

As to the operation under discussion, he has seen the late Dr. Green operate after the Smith method three times; he has not had the pleasure of seeing Dr. Vail operate; he has seen Dr. Fisher operate once, and he was holding himself open to conviction. There is not a member who is so blind as to feel that his results have been so satisfactory and so flattering that a better percentage of success cannot be obtained than he is obtaining in his practice. From the detailed accounts of work of men who are doing this operation, he feels a new era is opening in extracting the crystalline lens from the eye ball. He feels, however, that two things are essential to a successful issue of the operation. First, a larger experience than any man can obtain in private practice, therefore necessitating a large hospital and clinical experience to achieve the best results by the technic described. Second, it is necessary to have a corps of assistants more competent than those one is ordinarily accustomed to seeing in hospitals.

As to the use of the speculum, he has abandoned this as obsolete. Some means must be adopted to remove the pressure from the eye ball. He welcomes the Smith operation, and is personally grateful to Dr. Vail and to Dr. Fisher and others who have sacrificed so much to bring this operation and its definite details to the immediate attention of the profession.

Dr. Oliver Tydings stated that the intra-capsular operation for the removal of a cataractous lens, as performed by Smith, is the safest yet devised. The advantages gained in other things, such as freedom from post-operative inflammatory troubles, and after cataract, were admitted by all. Is it possible for a good operator to so protect his patient in this operation as to make him safe or more so than by the older methods? To this he would say yes. Dr. Vail had shown step by step how this work is done. He had also pointed out the two sources of danger to the vitreous. First, the pressure of the lids upon the globe before the zonula is ruptured. Second, the faulty use of the spoon when loss of vitreous is threatened. The advantage of Smith's method, when loss of vitreous was threatened, must appeal to all who have tried it.

Fisher has introduced some new features and devised two new instruments which added greatly to the safety and simplicity of the operation. First, the lid retractor which he gave to the profession ten years ago, the careful use of which aids in removing all pressure from the globe during the first part of the operation while the incision is being made. The most recent advance is the double hook. This replaces the single hook of Smith and does away with the necessity of a highly trained assistant. Any man who proposes to do the Smith-Fisher operation, should familiarize himself with the technic and thus be able to throw around the patient this additional security while doing the operation with which he is so familiar.

Dr. Richard J. Tivnen stated that in November, 1911, there was a symposium on cataract held by the Chicago Ophthalmological Society. Previous to this meeting he sent a circular letter to ophthalmoligists in the United States and received 150 replies. Excerpts from the replies were read. In the circular letter this question was asked, "Have you performed the Smith operation of extracting the cataract in the capsule, the so-called intra-capsular method? If so, in how many cases?" Dr. Peter Callan, of New York, in his answer said that Dr. Green had operated on two of his patients with success. In regard to the Smith operation Dr. Callan said: "One should not lose sight of the fact that Smith's patients are peasants, whose wants are few, and mental demands not great. Major Smith is in a class by himself, whose operations far outnumber those of any other surgeon living or dead. What he can do and does with impunity should not be attempted except under very favorable circumstances in the general run of cases such as we have in the United States. I have no doubt a good operator under Smith's instructions would be expert in his method; still I do not consider it as safe as the usual operation with capsulotomy."

Dr. Tivnen stated that his excuse for quoting Dr. Callan was that his reply reflected his own views in the matter and those of others regarding the Smith operation in this country.

Out of one hundred and sixty letters received, one hundred and eleven replied they did not perform the Smith operation, and forty-nine replied they had done it.

A second question was, "Based on your practical experience, do you regard the Smith operation of dealing with the lens capsule superior or inferior to the usual capsulotomy method?" Of the forty-nine who had performed this operation, eighteen considered the method superior to the capsulotomy method; seventeen considered it inferior, and in fourteen no opinion was expressed. Seventeen of the forty-nine who had performed the operation, and who considered it inferior to the capsulotomy method, each gave one of the following reasons: Danger of loss of vitreous, necessitating keeping an aged patient flat upon the back for a long period; unsafe to the average operator; corneal incision inferior compared with old methods; bandage left undisturbed for ten days is unsurgical and dangerous.

Eighteen of the forty-nine who had performed the operation and considered it superior to the usual capsulotomy method, each gave one of the following reasons: Simplicity; less danger of infection; freedom from post-operative irritability; no secondary healing; better vision; ideal for immature cataract; better in selected cases, etc."

Dr. Thomas Faith said ophthalmologists performed simple extraction for a while and did iridectomy, and then went back to the combined operation for some time.

Smith has worked out a method of preparation of the patient which is far superior to anything with which he is familiar. He does not know of any method of cleaning out the conjunctival sac like Smith does it, by using a lid hook and injecting bichloride into the conjunctival sac, being careful afterward to milk out, as it were, the bichloride solution from the conjunctival sac by pulling the lid toward the external canthus and allowing it to escape.

The technic of extracting the lens is far superior to the old method. By placing the hook on the lower margin of the cornea and keeping up pressure steadily, he has had the lens come out much cleaner than by the old method. Another thing which appeals to him is the Smith incision, which he did not understand until Dr. Fisher explained it.

He does not think applying a bandage over the eye and keeping it on for seven to ten days is unsurgical. One should not attempt to extract the lens and operate on the eye without he is reasonably sure there is no infection present and the wound is clean. It is not considered unsurgical to tie up any other wound for several days, and why should it be unsurgical in the case of the eye?

Dr. George F. Suker said the extraction of cataract is the most delicate operation known to surgery and appealed to him as the heighth of perfection in operative work. The greatest drawback to cataract extraction is the capsule. Whether much or little is left behind it is always a bugbear, more or less. The only way to remove it is to take away the lens in its capsule.

As to the Fisher lid retractor, it is the best of any physical appliance as far as he knows, in that it fixes the lid so that it cannot get away. One can raise the patients head with it, and yet not have the point go beyond the upper edge of the tarsus. That being so and the lower lid being fixed, if one applies the technic of Smith, as demonstrated by Vail, Green and Fisher, he will have as nearly an ideal operation as if he did the capsulotomy with it.

He mentioned a case in which he recently operated with a good result. By having the lid held by the Fisher retractor the patient is unable to do himself any damage. He is satisfied of that because the patient on whom he operated with the assistance of Dr. Fisher was unruly. Novices should begin to employ the technic with capsulotomy, and after they have done a number of these operations, they can try the Smith operation.

The hook in the delivery of the lens is far better than the ordinary method that has been in use. There is less damage done to the eye in delivering it in that way, and with the lid retractor and with the hook better results ought to be achieved. In removing the iris in doing an iridectomy, with one blade of the forceps on the cornea or pupillary area, and the other one on the upper edge of the wound, compressing the cornea, as it were, to squeeze out the iris and grasping the protruding iris, is good technic, but he agrees with Noble that a portion of the iris can be removed without injuring the capsule. Within a week or so in his service he has had two eyes (Dr. Fisher was present) on one of which a beautiful iridectomy was done by Dr. Darling and vision in that eye to-day is 20/30. If the introduction of the iris forceps will produce trouble with the capsule, the patient would have 20/50 vision.

The Smith technic cannot be improved upon except by having such assistance as mentioned in the advice and suggestions given by Dr. Fisher, and that is by the lid retractor. At the time of the symposium referred to by Dr. Tivnen, the speaker made the remark, and he believes it yet to be true, that the intra-capsular extraction of cataract is suitable for two purposes, one the removal of hypermature cataract, and the other the immature variety.

In a case he saw Dr. Fisher operate upon a little of the vitreous was lost, but Dr. Fisher did not use the spoon. Perhaps he did not think it was necessary to do so. While the amount of pressure in the removal of the lens seems enormous, if one tries it he will find it is not so. The introduction of the spoon in the preservation of the vitreous, giving it support is as good mechanical appliance as can be had for the retention of the vitreous when it presents, because in delivery of the lens upon the spoon there is no pressure upon the vitreous, and the direction of the force is at right angles to the plane of the spoon, and the lens is parallel to that of the spoon and it has got to come up perpendicularly; therefore, there is no pressure exerted upon the vitreous.

Dr. Fisher, in closing the discussion, thanked the members for the fairness they had shown in the intracapsular operation since he had returned from India. He had not noticed any opposition, and all who had witnessed his operation had expressed themselves as being interested. He sounded a warning, namely, that any one contemplating the intracapsular operation should master the Smith technic, and especially the lid hook, and spoon delivery in the old operation before attempting the removal of a lens in its capsule. When this is mastered a tremendous step will have been taken forward in the cataract operation, no matter what method is pursued. In Smith's latest paper the visual results are the best that have ever been reported. Results of vitreous escape have been reported by Smith, Vail, Greene and himself. He believes the doctors who gave Dr. Tivnen adverse reports a few years ago would be more favorable to the intra-capsular operation when they become more familiar with the Smith technic. He has never heard any unfavorable reports from any one whom he knew was familiar with the technic.

ROYAL SOCIETY OF MEDICINE, SECTION OF OPHTHALMOLOGY.

The ordinary meeting of the Section was held on Wednesday, February 4, under the presidency of Sir Anderson Critchett, Bart.

Mr. Frank Moxon showed a case of congenital diffuse opacity of the cornea in two sisters. The children and the family had been healthy; there was no history of syphilis, tubercle, or miscarriages. One of the children was ill with sickness and diarrhoea at a year old. Both Wassermann and von Pirquet reactions were negative. There was slight photophobia, but the fields of vision appeared to be normal. The cornea was milky, but there was a fairly good fundus reflex. The opaque spots were fairly evenly distributed throughout the thickness of the cornea. Lenses and vitreous were clear. Mr. J. H. Fisher considered that the tension in all four eyes was somewhat raised, and that there was a possibility of its being a variant of congenital glaucoma; the changes were mainly in the epithelium.

Mr. Angus MacNab showed a case of nodular opacity of the cornea, which he considered bore a relation to Mr. Moxon's case. In a similar case, shown before the Ophthalmological Society, the epithelium over the nodules was somewhat heaped up. At the extreme periphery of the cornea there were loops of vessels which passed into the cornea, and that seemed to be slightly so in Mr. Moxon's case.

Mr. J. B. Lawford showed a case of brawny scleritis. The ætiology, as in all these cases, was obscure. It was an inflammatory process, with much infiltration by cells: there was nothing to suggest new growth. Every test applied to the case had turned out to be negative.

Mr. W. S. Inman showed, through Mr. Leslie Paton, a case of irido-cyclitis in a boy who had been living in Northern Nigeria and was now suffering from trypanosomiasis Gambiensi. Last October his left eye became inflamed, and three weeks ago its fellow behaved similarly. Mr. Inman had the Wassermann reaction done, and it was positive; he probably had an idea of a syphilitic origin. But Wassermann was positive in the disease afflicting the patient. There was a beautifully marked circinate rash on the front of the thigh, and enlarged, soft posterior cervical glands, from which failing it being found in the blood, the trypanosome could generally be recovered. The Rhodesian form of the disease seemed to be more severe than the Gambian. Dr. Daniel, whom he asked about the case, said he would rather treat such a case with repeated small doses of atoxyl than with salvarsan. Mr. Treacher Collins referred to a case of sleeping sickness which he saw with Sir Patrick Manson, and described the appearances. Eye diseases seemed to be very uncommon in connection with sleeping sickness.

Mr. Ormond showed a case for diagnosis, and Mr. Whitehead (Leeds) discussed it. Mr. Cunningham showed a case of massive exudate in the retina.

The Section then proceeded to discuss the subject, "The Use of Salvarsan in Ophthalmic Practice," and it was opened by Mr. W. Lang. He reviewed the knowledge up to date, and discussed the probable mode of action of salvarsan. During the early stages of syphilis, before the spirochætes had reached the avascular tissues, salvarsan acted readily and quickly; but later it was less efficacious, though gummata of iris, sclerotic, and ciliary body seemed to be favorably influenced by the treatment. With regard to parasyphilitic diseases, the Argyll-Robertson pupil had been once known to again react to light following intravenous injections of "606." Ophthalmoplegia externa and primary optic atrophy had not been definitely improved by the treatment. After injecting a large dose of salvarsan into a rabbit's vein, none of it was found in the cornea, though specially searched for. The usual dosage of salvarsan for the adult male was .6 of a gramme, and for the adult female .5 of a gramme; while if neo-salvarsan were used, the dose must be 50% more. The destruction of the parasites should be effected as soon as possible, before they had the opportunity of becoming immune to the drug. He instanced cases in which greatly increased doses with that object had been very efficacious. Thanks largely to Mr. Browning, salvarsan was now known to be a successful treatment for sympathetic ophthalmia, and studies on the blood condition enabled one to foresee the onset of the condition.

Lt-Col. Gibbard, R. A. M. C., said that though salvarsan had not supplanted mercury, its action was more rapid and intense, and he narrated some striking cases illustrating this fact. Secondary lesions seemed to be more intractable than primary, and relapses were more frequent. The feature of secondary cases was the tendency to affections of the central nervous system, which was much more often involved than was formerly supposed. He did not believe this was due to salvarsan; cases were heard of more because everyone was on the look-out for untoward symptoms following the use of the new drug salvarsan. He knew of only two cases of cerebral nerve disturbance in one thousand two hundred cases where the drug was used. And where this did occur, an increased dosage caused a disappearance of the trouble. Syphilitic meningitis was more prone to relapses, because of the inaccessibility of the subarachnoid space. Having killed off the main army of the organisms, it seemed necessary to keep in the blood a remedy which would deal with scattered survivors. At his headquarters they had given four thousand intravenous injections, and the soldiers concerned were followed up wherever they went.

Mr. S. H. Browning read an interesting paper in which he detailed his citological studies, and the reasoning which led him to suggest giving salvarsan for sympathetic ophthalmitis. He had had excellent results in syphilis from salvarsan given *per rectum;* that the drug was absorbed when so given was proved by the occurrence of an arsenical rash following the method. Out of five hundred to six hundred cases, he had not heard of a single instance of ocular palsy, optic neuritis, or other similar trouble. The most successful results from the method were in syphilitic iritis; gummata of the sclera also vanished in a marvelous manner with salvarsan and potassium iodide. He agreed with the general opinion that in interstitial keratitis it was not much good, though there had been one or two notable exceptions. His usual method was to give the drug intravenously. Neo-salvarsan was more toxic than salvarsan.

The debate will be continued at a special meeting of the Section.

TRACHOMA IN KENTUCKY.

The annual trip to the mountains which Dr. J. A. Stucky, of Lexington, Ky., has made for a number of years, was completed by the return of the doctor and his corps of nurses last evening.

The party, which included Dr. Stucky, Miss Linda Neville, of the Society for the Prevention of Blindness, and Misses Amelia Milward and Jessie Greathouse, graduate nurses, left Lexington last Friday, and were joined at Nicholasville by Miss Davis, a student in the voluntary home mission department of the Southern Baptist Seminary at Louisville. The mountain journey was begun at Beattyville, the objective point being Booneville in Owsley county, and Oneida in Clay county, and was made with two wagons containing the supplies and three members of the party, while three rode horseback. Dr. Stucky described the visit to the district as follows:

"Arriving in Booneville just after sunset, I learned that Miss Neville and myself had been announced to address the people on hygienic and sanitary subjects. The ringing of the courthouse bell brought out a large, enthusiastic and appreciative audience. At 9 o'clock all were in bed, in order to get a good night's rest, preparatory to starting at 6 a. m. the next morning for Oneida, in Clay county, thirty-two miles from Booneville.

"The town of Booneville is one of the thriftiest and most beautifully located towns in the mountains, on the south fork of the Kentucky river. Here we were joined by Miss Emma

Ham, of the Kentucky Tuberculosis Commission, who was to accompany us to Oneida and assist in the clinic.

"The medical and legal profession as well as the clergy and the leading citizens gave hearty and cordial co-operation in every way possible. The next morning we were off for Oneida at six o'clock, where we arrived at 1:30, having made a record-breaking trip.

"The faculty of the Oneida School and Dr. Preston Jones gave us a cordial and hearty greeting and welcome. Misses Milward and Greathouse and myself were taken to Anderson Hall, the new Domestic Science building, while Misses Neville and Ham were taken to the girls' dormitory.

"After supper Miss Neville and myself talked to the students and citizens on health matters. Sunday our faculty was enlarged by the arrival of Drs. Manning and Anderson, of Manchester, and Dr. Lock and two assistant microscopists of Barbourville, Knox county. Two stereopticon lectures were given on Sunday and Monday night by Dr. Lock and myself, and Miss Neville spoke each morning and afternoon. One of the most helpful and appreciated incidents of the three days' clinic was the presence of Dr. I. N. Manning, of Manchester, the much-beloved general practitioner, who, though more than seventy years of age, came horseback to Oneida, a distance of fourteen miles, to be present and assist in holding the clinic. To that section of Kentucky he is the Dr. Maclure of the Bonny Briar Bush, whom to know is to love.

"Nearly two hundred and fifty were examined as to the condition of their eyes, nose and throat and for hookworm. Very little treating or operating was done, but plans were made for a week's clinic to be held in the fall—the latter part of September. A site was selected for a hospital and the equipment provided for.

"The examination made of the school children and the people living within a radius of five miles shows less of infectious eye diseases and fewer children needing medical or surgical treatment than any of the half dozen sections of the mountains that I have visited in the last five years. On two days we worked not only all day, but several hours at night. The State Board of Health and the State of Kentucky have reason to be proud of the great work being done at the Oneida Institute in Clay county.

"Returning, Misses Neville and Davis took charge of five patients, practically blind, who were taken via Beattyville and brought to the Good Samaritan Hospital. It is expected at the end of ten days or two weeks their vision will be so far restored that they will be able to earn a livelihood. Misses Milward and Greathouse and myself came via Manchester to Barbourville, seeing patients on the way. Everywhere there is growing interest in the work that is now being done for the eradication of this dread disease of trachoma. Especially is the profession aroused, and in Clay county they have the disease practically under control."—Lexington Leader, April 30, 1914.

Lexington, Ky., May 9, 1914.

The Department of Education, Frankfort:

In regard to your making the Conservation of Vision a subject to be considered at each one of the county institutes:

(1) It is my purpose to devote much time during this year and next year to showing the Kentucky teachers that they can accomplish great good for their pupils by doing voluntarily what the teachers of certain other states are required to do, that is, by making annual tests to find out the existence of defects of vision among pupils and by reporting the finding of defects of vision to the parents. To show the value to pupils of such tests and to show the teachers just how to make the tests will require at least a half hour of time. Please, if you can, set aside a half hour for this part of the subject. You will be interested in knowing that the American Medical Association issues pamphlets that set forth for the layman the testing of eyes among school children and that I can procure several copies for each institute. I shall visit many of the institutes and shall myself explain the method of testing. At the institutes at which I cannot be present I shall arrange for some physician or other qualified person to be present in order to do the work.

(2) In addition to the half hour to be devoted, if you see fit, to the matter of testing eyes, I very much want ten minutes in which to have explanation made to the teachers about trachoma, the contagious eye disease that the United States Public Health Service has found to be a terrible menace in certain parts of Kentucky and to be shockingly prevalent in some public schools of Kentucky.

(3) And in addition to the forty minutes I have asked for

on the program of each institute I want five minutes in which to appeal to the teachers to follow the example of certain teachers—of one teacher in Larue county, for instance—and to report to me at Lexington the names of all needy eye sufferers, adults or children, whom the teachers may find unable to procure skilled treatment for their eye sufferings.

To repeat: Inasmuch as the question of good vision is one that relates to the efficiency of our public school system, and, furthermore, inasmuch as poor vision has been found to interfere with the school work of hundreds, perhaps thousands, of children for the education of whom the school tax is collected by the state, will you not do all you can to enable me to have the subject of Conservation of Vision presented somewhat fully to the teachers of every teachers' institute during the summer and fall of 1914?

Will you notify me of the time when the instructors meet and allow me to be present with them at Frankfort for a full explanation of my plans?

Sincerely yours.
LINDA NEVILLE.

Two interesting newspaper items have recently appeared in reference to remarkable happenings to the victims of eye disease. One is from Baltimore, where a plastic operation is cited for the purpose of restoring the lids and thus preventing the injurious results of exposure, the skin being taken from the patient's arm. The other is from the Montreal Gazette, telling of a man who was blind from the result of ocular inflammation following inflammatory rheumatism. This man was struck on the nose by a piece of wood. Severe hemorrhage followed and the man immediately discovered that he could see distinctly.

One of the many pernicious quack remedies of the "Murine" class to be seen in the public prints is "Optona." Along with a sermon on the ineffectiveness and harmfulness of glasses is a statement of the wonders of this remedy, a tablet of which dissolved in water and used as an eye bath will benefit weak eyes, sore lids and even cataracts. The word "cure" is absent, no doubt for reasons of safety to the advertiser, but the public is assured of "clear, healthy, strong magnetic eyes" through the use of the remedy.

A RESEARCH FELLOWSHIP IN OPHTHALMOLOGY.

Investigations in the physics of light have usually been conducted by those who have had no practical knowledge of the pathological changes which it produces in the human eye. Ophthalmologists on the other hand have in large measure neglected the study of the art and science of illumination. The effect of light on the lower organisms has long engaged the attention of biologists, and the work of Loeb, Mast, and others on tropisms has enlarged our knowledge of its influence on cell life. Excursions have indeed been made by Parsons, Schanz, Stockhausen, Hallauer, and others upon the effects produced by various portions of the spectrum, but ophthalmic literature has been enormously lacking in any extensive original inquiries along these lines. During the last decade, however, the commercial necessity of electric and gas lighting interests has developed a new profession, that of Illuminating Engineering, and their investigations have added most generously to the data which is today available to the ophthalmologist. Within the last few years two books have been added, one by Louis Bell, Ph. D., which is a practically re-written edition of his already classic standard on the "Art of Illumination," and another by Wm. Edward Barrows, Jr., B. S. E. E., Professor of Electric Engineering of the University of Maine, on "Light, Photometry and Illumination."

It was as recently as 1906 that the Illuminating Engineering Society of the United States was organized. It now has more than 1,400 members, including those of allied interests, such as physicists, physiologists, ophthalmologists, architects, decorators and those representing other professions, as well as those engineers directly or indirectly interested in applied lighting. Working in co-operation with a committee from the American Medical Association, some important investigations have been conducted by Prof. C. E. Ferree of Bryn Mawr on the "Efficiency of Eyes Under Different Systems of Illumination," as a preliminary study to the causes of discomfort. The accomplishments of this young society are already noteworthy. It was by one of their committees that the initiative was taken resulting in a common unit of candle power for the photometry of gas and electric lamps in this country, and of an international agreement on a common standard light unit, the variations of which have caused much confusion.

An event at once of great scientific value and of practical importance bearing on this subject was the establishment of a Physical Laboratory, now known as the Nela Research Laboratory of the National Electric Lamp Works and General Electric Company, at Nela Park, Cleveland, Ohio, under the directorship of Edward P. Hyde, Ph. D., one of the most eminent Illuminating Engineers in this country. The laboratory had its inception in 1908, its purpose being, in the words of its director, "to develop the pure science rather than the applied art of illuminating engineering." The personnel of the laboratory, in addition to the director, consists of an assistant to the director, a physiologist, two associate and two assistant physicists, and an assistant psychologist, one mechanician, two stenographers, and three laboratory apprentices, making a total of fourteen persons, and to these have recently been added four others, making the laboratory one of the most effective and complete institutions for original research in this country. The scheme of the organization, as given by Dr. Hyde, is as follows:

"The Research Laboratory contemplates no sharp distinction among the different divisions of the work, but the problems to be investigated group themselves roughly into three classes: (1) Those which have to do with the production of luminous energy; (2) those which have to do with the utilization of luminous energy; and (3) those which have to do with the effects of luminous and attendant radiation. Under the first class comes the investigation of the laws of radiation and of the radiating properties of matter. The problems in this class are purely physical. Much progress has been made in the study of the phenomena and laws of radiation, but our knowledge in this field is still very meagre. Certain simple laws for the ideal complete radiator have been deduced as the result of theoretical and experimental investigation, but the values of the constants appearing in the corresponding equations are in many cases still in doubt, and even the form of the equations is not always agreed upon. Our knowledge of the deviation from the laws of the black body in the radiation of material substances is of most limited extent. The classification of matter on the basis of its radiating properties and the correlation of these properties with the other characteristic properties of matter have scarcely been attempted. Such a classification would be of the greatest scientific interest, and would be of invaluable benefit in the further development of the art of illumination.

"Under the third class comes the investigation of the effects of light and of the attendant radiation on the eye, on the skin, and on microscopic organisms, and of those more subtle but equally important effects of light on our mental phenomena, such as attention, memory, and the emotions. Problems in this class are physiological and psychological. The corresponding division is under the charge of a well-trained experimental physiologist, with the assistance of a trained psychologist. The possibilities in this field of work are unlimited, but the obstacles in the way of conclusive results, particularly of the effect of light on the eye and on our mental phenomena, are unusually great, owing to the inherent difficulties in the experiment. Many of the problems in this field, however, are rapidly being recognized the world over as vital to the welfare of the race.

"Intermediate between these two classes of problems—those having to do with the physical production of radiation on the one hand, and those having to do with the physiological and psychological effects on the other—which are distinctly different, there is another which forms the connecting link. The problems of this class have to do with the absorbing, reflecting, and diffusing properties of matter, the measurement of light, i. e., photometry, and the study of the complex phenomena of color and color sensation. The division of the work having to do with the study of these problems comes into closest contact with the actual problems in illuminating engineering practice. It serves as a medium by means of which scientific results of the other divisions of the laboratory are correlated and applied in a scientific way to practical conditions. As stated previously, the organization of the work into these three divisions does not contemplate sharp lines of demarcation between them, but is intended to insure attention to all phases of the problem before us in order that the concomitant development of the different lines of investigation may conduce to the most valuable integral results."

The work of the laboratory is collated in the "Abstract-Bulletin," which contains summaries of all of the research work carried out in the laboratory from its inception to the present date. The importance of many of these papers to ophthalmologists will be shown by some of the titles. These include the work of Dr. Ives and Mr. Luckiesh on heterochromatic photometry and on the study of color—among these are "Studies in the Photometry of Lights of Different Colors," "Color Measurements of Illuminants," "Effects of Yellow Glass on the Efficiency of Incandescent Lamps," "Substractive Production of Artificial Daylight," "Ultra-Violet Radiation from Ordinary Illuminants," "Light and Art," "A Study of the Natural and Artificial Illumination in Interiors," "An Analysis of Glare from Wallpaper," and other subjects of equal practical and scientific value.

The importance of the development of this project has been so great and the views taken concerning its purpose have been so broad that its management have been led to develop a new sphere of the work, which will be of great interest to physicians everywhere, in the establishment by the laboratory of a Research Fellowship in Ophthalmology. The appointment will be given to some properly qualified person to carry out the investigation of a selected problem having to do with light or other form of radiant energy on the eye. The fellowship will include a stipend, which is regarded more as an honorarium than as a salary, of about $700. Facilities will be provided for the conduct of the research work and the results will be presented before some appropriate society or published in a suitable journal. The laboratory includes a shop and library, which, together with the co-operation of the men of varied training constituting the laboratory staff, are put at the disposal of the worker who may be selected. The wish of the generous founders being to extend the advantages of the laboratory to those outside of its immediate connection. The name of any man who is fitted for this important appointment, and who would care to work out some special problem in light in relation to the eye should be submitted to the director of the laboratory at Cleveland.

F. PARK LEWIS.

DECLINATIONS, CYCLOPHORIA, AND "INSUFFICIENCY OF THE OBLIQUE MUSCLES."

To the Editors:

In regard to my article, "The Clinoscope as a Guide to Operative Eye Work," in the April issue of the OPHTHALMIC RECORD, Dr. G. C. Savage, of Nashville, has called my attention to the fact that what Dr. George T. Stevens terms retinal declination was his own original discovery, announced in 1891, "seven years before Stevens wrote his first line, or apparently had his first thoughts directed towards what he is pleased to term retinal declinations."

Dr. Savage requests me to make "correction of your error in the RECORD," and I replied to him that I would do so at my earliest opportunity; and I also take this opportunity to refer to page 93 in Dr. Savage's "Ophthalmic Myology," where he generously states: "To Stevens of New York is due much credit for his pioneer work in the study of the ocular muscles."

Dr. Savage's claim that he "began the correction of cyclophorias by operating on the recti muscles at their margin and not at the center" in 1893, I know to be a fact.

But, Dr. Savage states in his letter that Dr. Stevens claims that *he* discovered the condition called insufficiency of the obliques, or cyclophoria. If Dr. Stevens has made this claim in any of his writings I am not aware of it, though perhaps he has not given in turn to Dr. Savage the credit due to *him* for *his* pioneer work.

Personally, I think it right to state that I know of no physiologic authority or proof for the claim that the wheel-rotation of the eye on its antero-posterior axis is caused exclusively, even in the primary position, by the obliques to the exclusion of the superior and inferior recti. In secondary positions of the eyeball, not only the superior and inferior recti take part in governing the position of the meridians of the retina, but I believe the lateral recti also, or else operations on their tendons to correct false torsions and declinations would be of no avail. This is a contention which I published as far back as 1893.

The word declination to define the position of the retinal meridians has this, in my opinion, strong propriety: It is a term used in astronomy, physics, etc., to indicate an inclination from a zero point, and is measured in degrees, or degrees, minutes and seconds, as the case may require.

As a term etymologically harmonious with Stevens' nomenclature of the 'phorias; as indicating a 'phoria, a tendency to wheel motion only, *without reference to its cause*, I think Dr. Stevens would have done well to have adopted cyclophoria instead of the word declination.

F. B. EATON, M. D.
506 Broadway Building, Portland, Oregon.

NEWS AND NOTES.

Personals, and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date. H

Dr. Charles J. Spratt of Minneapolis died on April 12 at the age of 65.

Dr. Edward W. Blake of Tahlequah, Okla., died on March 13 at the age of 44.

The Massachusetts Eye and Ear Infirmary has received a donation of $1,000.

Dr. Hiram Woods of Baltimore is a member of the Board of State Aid and Charities of Maryland.

The London, England Local Government Board has made ophthalmia neonatorum a reportable disease.

The Manhattan Eye and Ear Infirmary, New York, has received a bequest of $2,125 for an eye clinic.

Dr. Kraus of Marburg, director of the Eye Clinic at Düsseldorf, Germany, to succeed the late Prof. Pfalz.

Dr. J. Wendell Clarke has been appointed to the ophthalmic staff of the Children's Memorial Hospital, Chicago.

Dr. W. H. Wilder of Chicago has been elected Vice-president of the Medical Reserve Corps, Illinois Division.

Dr. W. H. Woodworth of Delaware, Ohio, has moved to Norfolk, Virginia, where he will practice ophthalmology.

Dr. Alexander S. Rochester of Chicago was married to Miss Harriet M. Carnahan of Columbus, Ohio, on April 18.

The New York Association for the Blind has inaugurated a campaign to secure $300,000 for their Home in New York City.

A memorial service for the late Dr. John Green was held on April 2nd in the chapel of Washington University in St. Louis.

Dr. Major H. Worthington has returned to Chicago after an absence of several months and resumed practice at 22 East Washington St.

The following appointments are announced:

Mr. Arnold Lawson, attending ophthalmologist to the Middlesex Hospital, London, England.

Special train service is provided for those attending the A. M. A. at Atlantic City, June 22-26. Dr. Frank Todd of Minneapolis is Chairman, and Dr. George S. Derby of Boston Secretary, of the section on Ophthalmology.

Summer sessions are held in Stanford and St. Louis Universities, offering instruction in ophthalmology. Each institution gives approximately six weeks work. Dr. Barkan at Stanford, and Drs. Barck and Loeb at St. Louis, are in charge of these courses.

At the recent meeting of the Illinois State Medical Society, Dr. Carroll B. Welton of Peoria was elected Chairman, and Dr. Joseph Beck of Chicago Secretary, of the Eye, Ear, Nose and Throat section. The next meeting will be held in Springfield in May, 1915.

The British House of Commons has under consideration the question of provision for the care and education of the blind. The discussion has brought out the observation that there are 5,000 blind persons in England whose misfortune is due to lack of attention at the time of birth.

The Massachusetts Eye and Ear Infirmary announces examination for interne on June 18, 1914. The service is for eighteen months, with residence in the hospital. Applicants are examined on anatomy, physiology, bacteriology, pathology, clinical medicine and therapeutics, and surgery. Application must be made before June 10 to the superintendent, Dr. Farrar Cobb, 233 Charles St., Boston, Mass.

NEW BOOKS.

Diagnosis and Therapy of Diseases of the Throat, Nose and Ear. Lectures Given in the Postgraduate Courses for General Practitioners by Dr. Richard Kayser, Breslau. Second Revised Edition with 130 Illustrations. Published by S. Karger, Karlstrasse 15, Berlin, 1903.

A History of Laryngology and Rhinology by Jonathan Wright, M. D., Director of the Department of Laboratories, New York Postgraduate Medical School and Hospital. Second Edition, Revised and Enlarged. Published by Lea & Febiger, Philadelphia and New York, 1914.

Diagnostics of the Fundus Oculi, by Edward L. Oatman, M. D., Surgeon Manhattan Eye, Ear and Throat Hospital and Brooklyn Eye and Ear Hospital, New York, Consulting Ophthalmic Surgeon Nyack Hospital and St. Mary's Hospital, Waterbury, Conn. Comprising one volume of text (293 pages) with two hundred and thirty-four illustrations and four colored plates, and two portfolios containing seventy-nine stereograms and eight diagnostic cards. Troy, New York. The Southworth Company, 1913.

The Diagnostics of the Fundus Oculi is by far the most complete work on this subject published in any language. The text is particularly complete and covers details of especial value to men in other fields of medicine than ophthalmology. The main volume of text is printed on dull surfaced paper with very clear type. The two volumes of stereograms make the work especially valuable as an aid in teaching. Such conditions as slight retinal detachment which appear flat with the unaided eyes, look entirely natural through the stereoscope. The number and variety of cases presented in these colored stereograms evidences long and painstaking work in their collection and assembling.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) M. Frank (E. M. D.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm E. Gamble (U. of I.) Wm. H. Wilder (Rush)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
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ORIGINAL ARTICLES

CONSERVATION OF VISION.

BY FRANK ALLPORT, M. D., CHICAGO.*

Societies for the Conservation of Vision have been formed in various portions of the United States. They exist under different conditions. The membership in some is medical and in others, lay and medical.

In Pennsylvania, Indiana, Missouri, etc., the organization exists as a Committee of the State Medical Society; in New York, Illinois, etc., independent associations have been formed; in Ohio the "Commission," as it is called, is a part of the State Government. There is also a National Association, independent in its nature, and mixed in its membership. Some of these Associations, such as New York, Massachusetts, Maryland, Ohio, etc., are doing energetic work, while others are inactive and almost useless.

At the 1913 meeting of the American Medical Association, the Council on Health and Public Instruction appointed a Committee on Conservation of Vision consisting of E. M. Alger, New York City; W. E. Bruner, Cleveland, Ohio; H. D. Bruns, New Orleans, La.; J. J. Carroll, Baltimore, Md.; E. C. Ellett, Memphis, Tenn.; Harold Gifford, Omaha, Nebr.; Vard Hulen, San Francisco, Cal.; W. B. Lancaster, Boston, Mass.; F. Park Lewis, Buffalo, N. Y.; Wm. C. Posey, Philadelphia, Penn.; W. H. Wilder, 122 So. Michigan Ave., Chicago; Casey A. Wood, Chicago; Hiram Woods, Baltimore, Md.; and Frank Allport, Chicago, Ill.; of this Committee I was appointed Chairman. The object of the Committee was to produce interest and action in Conserving Vision, and to endeavor to concentrate under the auspices of the American Medical Association activities calculated to preserve the sight of this, and coming generations.

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*Read before the joint session of the Chicago Medical Society and the Chicago Ophthalmological Society, May, 1914.

We began our work by utilizing the machinery of the American Medical Association. The Council on Health and Public Instruction sends out each week a sheet called The Press Bulletin. This is sent free to nearly six thousand newspapers, and the printed matter upon its face can be used by the papers as editorials, news matter, etc. The printed matter consists of short, plainly written articles on health topics. They are unsigned. The Council employs clipping bureaus, and through them it is ascertained that these articles are very extensively used. They are shaping public thought along medical lines in this country. The Conservation of Vision Committee has an appropriate article in the Bulletin each week, and its articles on "The Eyes and the Movies," "Face Powder and the Eyes," "Cross-Eyes," "Illumination in Homes, Offices, Schools, etc.," "Golf Accidents to the Eyes," "What is a Cataract," etc., etc.—have been extensively copied all over the country. The Committee feels that this is a most important part of its work—as it reaches so many people, and is under direct control.

The next work of the Committee was to write, print and circulate twenty pamphlets on popular eye topics. These are called "The Conservation of Vision Pamphlets" and are numbered from one to twenty. They are handsomely gotten up, in uniform style. The authors' names are given. They are short and plainly written, so that non-medical people can easily understand them. They are well illustrated. They sell for five cents a copy, or one hundred copies for $3.50. They are also freely given away on proper application to either me, as Chairman of the Committee, or to Dr. F. R. Green, Council on Health and Public Instruction, American Medical Association, 535 North Dearborn St., Chicago, Ill. Sets of these pamphlets have been sent to public libraries, women's clubs, teachers' institutes, state legislatures, health boards, etc., etc., all over the United States, and the sale and distribution has been extensive. Some of the pamphlets are already in their third edition. Arrangements are being made to distribute Dr. Carroll's Pamphlet on the "Eyes of Transportation Employes" to every railroad surgeon in the United States. I give here a list of the pamphlets:

Pamphlet I.—Schoolchildren's Eyes, by Dr. Frank Allport, Chicago.

Pamphlet II.—Industrial and Household Accidents to the Eye, by Dr. Harold Gifford, Omaha.

Pamphlet III.—Wearing Glasses, by Dr. W. B. Lancaster, Boston.

Pamphlet IV.—The Relation of Illumination to Visual Efficiency, by Dr. Ellice M. Alger, New York.

Pamphlet V.—Trachoma in Eastern Kentucky, by Dr. J. A. Stucky, Lexington, Ky.

Pamphlet VI.—Auto-Intoxication and the Eye, by Dr. H. D. Bruns, New Orleans.

Pamphlet VII.—Eye-Strain, by Dr. Hiram Woods, Baltimore.

Pamphlet VIII.—Lenses and Refraction, by Dr. Frank Allport, Chicago.

Pamphlet IX.—The Eye and Its Function, by Dr. Frank Allport, Chicago.

Pamphlet X.—Care of the Eyes, by Dr. Frank Allport, Chicago.

Pamphlet XI.—Infant Blindness, or Ophthalmia Neonatorum, by Dr. F. Park Lewis, Buffalo, New York.

Pamphlet XII.—Ordinary Eye Diseases, by Dr. L. W. Dean, Iowa City, Iowa.

Pamphlet XIII.—Usual and Unusual Eye Accidents, by Dr. E. C. Ellett, Memphis, Tenn.

Pamphlet XIV.—The Eyes of Transportation Employees, by Dr. J. J. Carroll, Baltimore.

Pamphlet XV.—Ocular Hygiene in Schools, by Dr. S. D. Risley, Philadelphia.

Pamphlet XVI.—Whisky, Tobacco and Drugs and the Eye, by Dr. Edward Jackson, Denver.

Pamphlet XVII.—The Oculist and the Optician, by Dr. Melville Black, Denver.

Pamphlet XVIII.—Preparation for Blindness, by Dr. F. Park Lewis, Buffalo.

Pamphlet XIX.—What to Do for Blind Children, by Dr. F. Park Lewis, Buffalo.

Pamphlet XX.—Blindness from Wood Alcohol, by Dr. Casey Wood, Chicago.

I would like to suggest that these are excellent pamphlets for Doctors to keep in their offices and on their reading tables for distribution and education. I am constantly giving away these pamphlets to patients who, having seen them, desire them. Some people wish information on one subject and others desire knowledge along other lines. The pamphlet topics are sufficiently varied, to fill the wants of most people. Besides this it often happens that an oculist desires to instruct a certain patient on a particular subject. Almost all eye subjects are mentioned in these pamphlets and are plainly and understandingly discussed, and it would be far easier to give such patients an appropriate pamphlet or two than to take the time to explain the subject personally.

It seemed desirable to the Committee to create a national sentiment in favor of Conservation of Vision, and for this purpose it was determined that lectures on this subject should be delivered in each state. A Lecture Bureau Manager was appointed in each state who was willing to superintend the work in his state. Where a state organization for the Conservation of Vision existed, one of its officers was selected to carry on the work; but where no such state organization existed a prominent, energetic and willing oculist was selected. The plan was about as follows:

The "State Manager," as he is called, should enlist the assistance of all the oculists he could to assist him in his work, acting, wherever possible, in harmony with local and state medical societies, both ophthalmological and general. Prominent and energetic oculists should be found who were willing to lecture on the Conservation of Vision on invitation. Such lecturers should reside in different portions of the state, so that long and expensive journeys should not be necessary. The State Manager should correspond with local medical societies, women's clubs, teachers' institutes, boards of health and education, etc., and secure invitations for a lecturer to go to different cities to talk on the Conservation of Vision. Lectures should if possible be arranged for, one month in advance, to give time for preparation, and necessary ethical advertising. The lecturers' expenses should, if possible, be paid for by the ones issuing the invitation. The lecture should last about one hour and should be given in plain and unscientific language. A discussion should follow. In order to make these lectures easy to deliver, the Committee prepared a box of about thirty colored and uncolored stereopticon slides and sent them to each State Manager, to be loaned to his associates in the work whenever a lecture was to be delivered. These slides were securely packed in a strong box and locked with a Yale key. The box could be shipped from place to place by express, the key going to its destination by mail. In addition to this a pamphlet was prepared entitled "A Plan of Campaign for the Conservation of Vision." This pamphlet contained a full description of the plan, and what it was proposed to accomplish. A kind of skeleton lecture was included in this pamphlet suggesting subjects, etc., to be referred to in the lecture. These pamphlets were freely dispensed to all State Managers, who distributed them to their associates in the work. Besides this, each lecturer was placed on the mailing list for the Press Bulletin, to which reference has already been made, so that he could see the new articles as they came out each week, and perhaps use them in his lectures. Each lecturer also received a complete set of the Conservation of Vision Pamphlets, as it was thought that these would greatly assist him in preparing his lectures. Quantities of the "Vision Charts for Schools," were sent into each state so that the lecturers could have all they desired of them. While these lectures were intended to cover all avenues of Vision Conservation, it was especially hoped that it would result in the use of the Credé treatment of the eyes of all new born babes; in the lessening of shop accidents; and in the annual and systematic examination of all school children's eyes by school teachers; for it is reasonably certain that if these three procedures could be universally adopted, 80% of all blindness could be eliminated from this country. The Credé treatment for new born infants, the providing and using of goggles and other shop safety devices for eyes, and the annual, systematic examination of school children's eyes, ears, noses and throats by school teachers in the United States could be accomplished at an annual cost, which would not exceed $250,000 per annum. It costs $15,000,000 a year to care for the dependent blind in this country alone, to say nothing of those children more or less incapacitated by defective or diseased ears, noses and throats. Inasmuch as the examination of ears, noses and throats is provided for in the questions annexed to the Vision Chart, for the teachers' use, and as abnormal conditions of these organs can be investigated easily and speedily, at the same time the eyes are examined, and as the benefits to be achieved by this addition are enormous, it is earnestly recommended that teachers will include the ears, noses and throats in their investigations.

Emphasis should be laid on several points connected with these annual, systematic examinations of school children's eyes, etc., by school teachers.

(1) The examinations are simple and require no medical education.

(2) Teachers are not expected to make diagnoses. They merely ascertain the fact through the questions, that something is wrong, and leave the rest to the doctor selected by the family for consultation.

(3) A child can be easily examined in five minutes and each teacher should examine the children attending her own room. By subdividing the work in this way, all the children in any city of any size can be easily examined in one day—A definite day in the early fall—of each year, should be set aside for these tests in all cities.

(4) These tests not only benefit the children by leading to the correction of their eye, ear, nose and throat defects, but the correction of these defects *benefits the teachers,* because such corrections usually add materially to the intellectual and moral character of the children, thus rendering them much easier to teach, and more pliable to discipline. Teachers should therefore be glad to do this work, without grumbling, both from selfish and unselfish reasons.

(5) There is no objection to these examinations being made by doctors or school nurses. This, however, would cost large sums of money and Boards of Education and Health are never allowed enough money for even ordinary purposes. This is a fact which might as well be frankly recognized and acted upon. Let teachers therefore devote one day in the year to this work and get it done. They are easily capable of doing it. It takes no extra time for them. It is a benefit to themselves as well as to the children. It costs practically nothing. Therefore let it be done.

The question may be pertinently asked, what has been the result of the State Lectures? This has varied greatly in different states. No man was compelled to accept the position of State Lecture Bureau Manager; the acceptance was voluntary and was decided after the work and ideals were thoroughly explained. After a promise of conscientious work was given, the box of slides and printed matter were sent, which represented an outlay of about twenty-five dollars in money, for each state. In some states this (at least, so far as results are concerned) has ended the matter. So far as I know, no work whatever has been done in some states, no lectures have been delivered, and nothing has been accomplished. My letters have been unanswered, my appeals have been unheeded. Perhaps a letter has been finally, at the end of the season, received, informing me that, I do not understand conditions, in that particular state, or that sickness or business, or moving, or bad weather, or some equally important reason has prevented taking up the lecture proposition. Of course, after a gentleman accepts a position of this kind, and agrees to do the work, I felt I had a right to depend upon his cooperation, and having once appointed him, the state was left in his charge and I felt I had no right to interfere. It has been therefore most discouraging, for me, at the end of the season, when it was about time for me to make my report to the Council on Health and Public Instruction, and when it was too late to change State Managers, to realize that no *real* work had been accomplished in quite a number of states. In some states, the work, for one reason or another has been delayed, but still work has been done, as many lecture engagements have been made for next fall with Medical Societies, Teachers' Institutes, Chautauqua Meetings, Women's Clubs, Educational Conventions, etc. But I rejoice to say that in most of the states honest, conscientious work has been accomplished, and excellent results have been achieved. The results are, of course, not all that could be desired, but still, considering that this is the first year of the Committee's existence, I should be ungrateful indeed, if I did not feel gratified and much obligated to those gentlemen who have given this project their time, their labor, and their means. I beg to present toward the end of this article a tabulated report of this work up to the time of giving this narrative into the hands of the printer.

The question as to the future of this work now remains to be discussed. I would recommend:

(1) The continuance of a weekly article on the eye for the Press Bulletin of the Council on Health and Public Instruction.

(2) A few more Conservation of Vision Pamphlets on interesting subjects and the increased circulation of these Pamphlets.

(3) The continuation of the Conservation of Vision lectures in the various states. Many more of these lectures should be delivered, and the State Managers should be changed, where the present Managers have not shown a reasonable interest in the work.

From 20 to 25 new slides for the stereopticon should be made, that will more fully illustrate the subject.

(4) I was at first in favor of encouraging the formation of State Societies for the Conservation of Vision, these societies to possess complete self government, but all of them to declare themselves in affiliation with the Committee on Conservation of Vision, of the Council on Health and Public Instruction of the American Medical Association, by a slender thread of connection. I was also in favor of asking those states already possessing state organizations, to join with us in the same sort of affiliation. I was also in favor of proposing an annual meeting of this affiliated organization and the formation of a national body of this nature for the Conservation of Vision. Time and experience have, however, considerably modified my views and I now believe that other plans are better.

In the first place, there is already a national society of this nature. It is, it is true, highly inactive but still it exists and should, I believe, be encouraged to an awakening activity.

In the second place, local conditions, in many of the states, are not conducive to friendly assistance. However well meant such assistance may be, it will in some states be regarded as meddlesome interference, and as an effort to rob existing organizations, whether active or lethargic, of some credit, which it is felt, should remain with the local organization, and not be shared with even a well intending interloper. These views, I presume, are but natural to those people who have worked hard to develop a praiseworthy State Society. They want the credit for their work and should have it, and I believe it is better that they should be let alone, and not asked to merge their identity or work with that of another organization. My recommendation, therefore, for the future is, that this Committee shall do what it can to inspire the formation of State Conservation of Vision Organizations, either as independent medical and lay societies, or as Commissions of the State Governments. It shall stand ready to advise and assist such work in any possible manner, but it shall not suggest a formal connection of any description, with the Committee of the American Medical Association. This Committee should also be equally ready to advise or assist State Organizations that already exist, and should co-operate with them in any way they may properly request.

(5) I would recommend that the work of this Committee be extended, so that it shall become a potent power in the community. It should have a central office with a paid, interested, intelligent, energetic secretary, who could and would from time to time journey from state to state, upon request, and assist in the formation and perpetuation of State Societies for the Conservation of Vision. His traveling expenses should be paid by those who summon him to the various localities. He should have a well equipped office, with one or two stenographers, and a library and files, containing *everything* that is printed on the Conservation of Vision. This office should be recognized as a Central Bureau of assistance, advice, literature, laws, etc., where all questions concerning this subject can and will be intelligently and willingly answered. Plans should here be devised for the formation of societies; for constitutions and by-laws; for the best ways of carrying on the work; for the building of model laws; and the best means of influencing Legislatures and Boards of Health, Education, etc. The work of such an office would be enormous and its influence widespread. Its work and purposes would enlarge and develop as time progressed, and I do not see how this noble enterprise can reach its legitimate and ultimate purpose unless something of this kind is made possible. But to do this considerable money would be absolutely necessary and I therefore recommend that this money shall be forthcoming from some source and that the good work shall be encouraged to go on.

(6) The distribution in all schools of crisply and plainly written leaflets concerning the care of eyes, ears, noses and throats. They should be taken home so that the parents can read them. They should be printed in various languages.

Perhaps even a better plan would be to have suggestions of this kind printed on the blank fly-leaf of all school books. The expense of printing would be almost nothing and the benefits to be derived, would be incalculable.

I wish to thank Dr. H. B. Favill, Dr. F. R. Green and the Council on Health and Public Instruction for the moral and financial assistance they have rendered our Committee. I also wish to thank all those who have written for the Press Bulletin and the Conservation of Vision Pamphlets. I also wish to thank all those who have assisted us in the work of the State Lecture Bureaus.

I will now append a tabulated report of the State Lecture Bureau Campaign and desire to say that a large part of the work done in Ohio has been done under the auspices of the Ohio Commission for the blind.

No.	State	Manager	Number of Lectures	Number of Lecturers	Number of Cities	Estimated size of Audience
1	Ga.	Dunbar Roy	10	10	10	1,975
2	S. C.	C. W. Kollock	10	8	6	950
3	Ala.	S. Ledbetter	8	6	7	1,000
4	Ore.	J. L. McCool	3	1	1	300
5	N. C.	C. W. Banner	7	4	4	2,000
6	Kans.	R. S. Magee	7	5	6	1,050
7	N. H.	E. Fritz	8	7	8	1,725
8	Wyo.	G. L. Strader	1	1	1	100
9	Tenn.	E. C. Ellett	4	4	4	850
10	N. Y.	F. P. Lewis	2	2	2	225
11	Ark.	H. Moulton	5	4	5	400
12	Mo.	C. Loeb	15	12	8	2,300
13	Utah	D. M. Lindsay	25	12	24	4,675
14	Me.	J. A. Spaulding	23	14	20	3,000
15	N. D.	J. H. Rindlaub	19	8	19	4,000
16	Conn.	G. H. Warner	2	1	2	850
17	Wash.	R. W. Perry	13	6	10	1,520
18	Md.	H. Woods	14	7	7	8,050
19	Ohio	W. E. Bruner	59	39	59	14,300
20	Ky.	J. A. Stucky	35	2	35	10,350
21	Del.	J. A. Ellegood	3	2	3	675
22	Idaho	R. L. Nourse	2	1	1	525
23	Va.	J. A. White	4	4	2	500
24	Minn.	F. C. Todd	3	3	3	500
25	Iowa	E. R. Lewis	3	3	3	500
26	Wis.	N. M. Black	1	1	1	250
27	Wash. D. C.	O. Wilkinson	2	1	2	200
28	Mich.	W. R. Parker	4	1	3	1,430
29	Ind.	A. E. Bulson, Jr.	45	20	25	5,000
30	Neb.	J. M. Patton	2	1	2	225
			339	190	283	69,425

It will thus be seen that 30 states have reported work; 339 lectures have been delivered; by 190 lecturers; in 283 cities; to audiences aggregating 69,425.

When to this is added the hundreds of thousands of people who have been reached through the newspapers, by the distribution of the Press Bulletin, and the thousands of people who have been reached by the Conservation of Vision Pamphlets, it will be seen that the work of this Committee has not been in vain. I desire to also add that probably through the agency of the lectures, in the various states, School Inspection of Eyes, Ears, Noses and Throats have been established in, at least, 200 cities.

THE RELATED FIGURATIVE CHIASMAL AND MEAN CYCLOPEAN IMAGES.

Incorporating a Reply to A. T. Poffenberger, Jr., Ph. D. Columbia University.

BY CHARLES F. PRENTICE, M. E. OF NEW YORK.

In the February issue of this journal the author, through the aid of original diagrams and simple mathematics, proved that "for each prism-dioptry of deviation between the visual axes there is a separation of the dual chiasmal image-centers equal to 0.15 mm.: that the chiasmal images are separated when the retinal images are smaller than the foveal displacement, and that they overlap each other when their retinal images are larger than the foveal displacement in the deviating eye". In fact, this new axiom has already been approved by several well known physicists, both in this country and abroad; and, moreover, has not even been discredited in the June issue by Mr. Poffenberger, who, nevertheless, for other reasons, has made necessary the present elaboration of the author's original article. In it the transverse section of the optic chiasm was graphically used merely as an imaginary plane in which to actually picture the retinal images as they are mentally conceived, and which, in this supposed state of perception, were called *figurative* chiasmal images, in order to distinguish them from the actual retinal images occupying separate areas. In fact, this and the advantage the chiasmal image offers to the draftsman in producing lucid diagrams, is the only excuse offered for its use.

Moreover, it was emphasized that the chiasmal image was not to be construed as an actual image, but that "it shall signify (figuratively, of course) that orderly assemblage of the optic nerve fibrils which receive their individual stimuli from corresponding points in each retinal image"; this having been said in order to make it clear that the drawings were produced through projection of *corresponding points* within the retinal image-areas into the chiasmal field, notwithstanding the admitted fact that its actual diameter is inadequate to accommodate the nerve-fibrils which are supposed to transmit, in one way or another, conjecturally or otherwise, the ocular images themselves. In fact, the diagrams alone furnished evidence of the needful exaggeration of the chiasmal field, regardless of the courses of the nerve-fibrils. Besides, it was suggested that "the figurative chiasmal image should be accepted, if for no other reason than that it at least makes it easy to produce diagrams in which the retinal images and the image or images conceived by the brain are separately pictured."

Fortunately, Mr. Poffenberger admits that "such a figurative expression can do no harm, if its figurative character is kept in mind." Thus, he has conceded the very point that is alone vital to the author's intended demonstration. Nevertheless, he took some pains to hide the author's achievement, through ascribing to him such false notions in anatomy and physiology as to convey the idea that these necessarily vitiated whatever he may have attempted to prove, notwithstanding the fact that the psychologic aspect of the theorem had been relegated by the author to the realm of "pure conjecture".

However, the author did not, and could not, from an authoritative point of view in psychology, attempt to establish any theory respecting the actual courses, behavior or location at the chiasm of the various optic-nerve fibrils; beyond having ventured to follow the precedent of Professors Hall and Hartwell, with respect to *corresponding points*, by assuming that "the axial image-point of each eye at the fovea is conveyed by its corresponding optic-nerve fibril to the center of the chiasmal field"; an assumption actually made necessary to reconcile mental orientation of the images with respect to a common center of visual perception of an object centered upon the median line, as well as the construction of the diagrams portraying them. Yet, singularly enough, this phraseology, from among all other of its forms, was not selected for criticism, though the principle which it involves is a most vital one to the author's demonstration. Consequently, it is again repeated that, if both macular centers were not transmitted by their own nerve-fibrils so as to produce superposed images of themselves at the center of the optic commissure, there not being any substantiated evidence to the contrary, and a similar coalition of them did not exist somewhere in the brain itself, the images in both eyes would necessarily be conceived by the brain as *dual images,* so that diplopia would exist under all circumstances. It is, therefore, obvious that, in *orthophoria the centers of the ocular images* must be so projected, at least in a drawing, as to exactly cover each other at the center of the figurative chiasmal field; or, expressed in terms of the printer, *they must be in perfect register,* thus requiring their point-to-point projection to this center * in the diagram in order to correspond to the supposed center of orientation for the orthoscopically conceived brain-image itself. Such a point of orientation is quite as necessary to pictorial illustration in ophthalmology as the prime meridian at Greenwich is to navigation, or the pole star is to astronomy, for without it one could not definitely interpret the difference between right and left, or up and down, in constructing a diagram in accordance with the rules of projection that apply to mechanical drawing. Consequently, so far as pictorial illustration is concerned, it is necessary to accept this point-to-point correspondence, even though the most recent investigations may have proven that this is not punctiliously correct for certain peripheral extensions of the object from its center on the median line, or for points of binocular fixation not located upon it.

It was hardly to have been anticipated that it would ever be necessary to explain to the professional mind that an image to be *orthoscopically* conceived by the brain must be produced through fusion into a single image, somewhere and by some means, of two similarly conceived ocular images of the same size. However, this being the fact, the single image, located at the visual center of the brain, is produced quite the same as if it were transmitted from a single image whose center is the *point of orientation* at the fovea in a single *mean eye* (cyclops) *, situated on the median line, exactly between the eyes. See Fig. 1. Moreover, as the writer desired to profit by the advice of the philosopher, Schoppenhauer ("If it is ventured to promulgate a novel idea, it is always prudent to withhold some principle vital to its defense"), it was not intimated that a *figurative cyclopean fovea,* in addition to the *center of*

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*This correspondence of macular points in the superposed retinae is accepted by Hall, Hartwell and Titchener.

the chiasmal field, should be accepted as another point of orientation in comparing the relative positions of the retinal images in the phorias. Still, in all of these manifest conditions two ocular images are produced, so that some point of orientation that is somewhere definitely located must be chosen, if the positions of these images are to be compared; and as in heterophoria, for instance, it is generally assumed that one eye is properly directed, its macular center is, of course, projected into the center of either the brain-image, chiasmal image, *or* corresponding mean cyclopean image, whichever may be chosen; whereas, the center of the ocular image of the misdirected eye is as far from any of these centers of orientation as it is from its own fovea.

Therefore, as conception by the brain of two ocular images absolutely requires orientation of these images with respect to a *common center,* the transverse plane through the *optic chiasm* was thought to be the logical and most convenient place in which to make comparison between the actual positions of these images, and simply because the image of each eye has its own and a differently located center. In suggesting the chiasm for this purpose, it was distinctly stated that the chiasmal images, as delineated in the diagrams, are not supposed to exist in any other than a strictly *figuratively* sense, and in much the same manner as the *virtual image* of a lens or mirror, and the *virtual far point* behind the hyperopic eye are thought to exist in the minds of persons versed in optics. Besides, the hypothesis of a figurative image (not admitted by the author to be located anywhere but at the chiasm) in orthophoria does not necessarily mean that the imaginary chiasmal images in heterophoria should be smaller than the retinal images in order that they may appear in their entirety within the more circumscribed area of the chiasm. In fact, as stated by the writer in the American Encyclopedia of Ophthalmology, "this is quite immaterial, when merely comparing the *positions* of the images transmitted from both retinae into the transverse plane of the optic commissure, and that may or may not there, either within or outside of the confines of the chiasm itself, constitute a single chiasmal image of the size conceived by the brain in either orthophoric (orthoscopic) or heterophoric vision, respectively." Moreover, this purely imaginary chiasmal image is quite as conceivable as the *all permeant ether* through which light is supposed to be propagated, and is fully as justifiable, so long as this figurative image can be shown to serve a useful purpose.

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* "It makes a difference in apparent projection-distance whether an object be seen with the right or the left eye, so that we ought not to say identical points with reference to an object, but *coincident points,* as if the retinae were *laid one within the other like two cups;* etc., etc.; that the error in putting the finger through a ring is greater when the right than when the left eye is closed, so that a *true, mean, cyclopean eye* would be slightly to the right of the median line." Bilateral Asymmetry of Function. By G. Stanley Hall and E. M. Hartwell. The Psychophysical Laboratory, John Hopkins University, Baltimore, M. D.—Mind, Vol. IX, p. 93, London, 1884.

The following extract from Titchener's Textbook of Psychology (1911, p. 309) corroborates the character of a mean eye, in which "a pin" is substituted for the median line: "Think of the two retinas as slipped, the one over the other, and as held together by a pin driven through the superimposed foveas. *The two pin holes then represent corresponding points,* the retinal points *stimulated by the point in objective space which the eyes,* at any given moment, *are fixating.* Let other pins be driven vertically through the two retinas, at any points round about the fovea: in the rough, every pair of holes will represent a pair of corresponding points. Now, it is clear, if you work the matter out by help of diagrams, that when the eyes are in a certain fixed position, only a certain number of the points in objective space can be imaged upon corresponding points."

The italics have been introduced by the writer in order to emphasize evident corroboration of his contention.

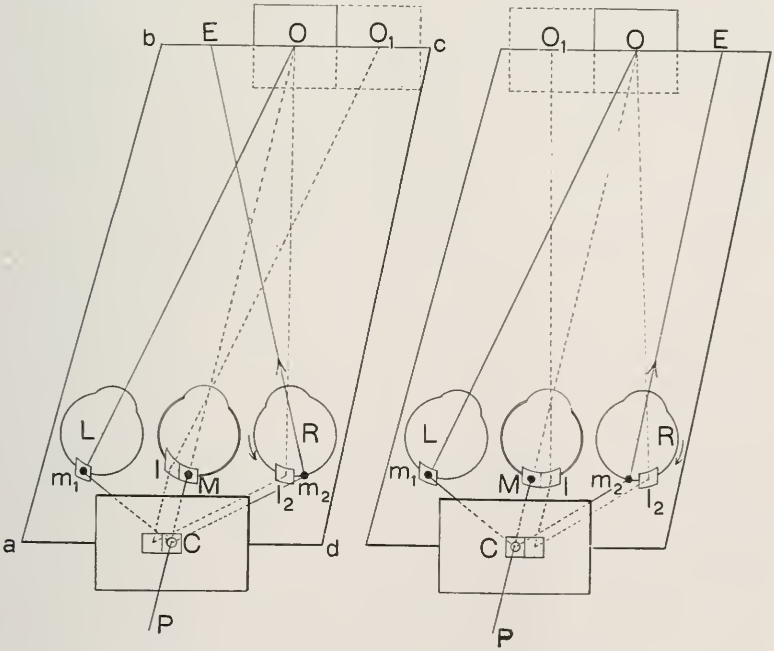

Fig. 1.
Homonymous Projection

Fig. 2.
Heteronymous Projection

Contiguous Mean Cyclopean Images derived from Figurative Chiasmal Images.

In order to demonstrate the purpose and need of at least one point of orientation, although two different ones will be here jointly applied, let it be supposed that the diagram, Fig. 1, represents a horizontal plane, abcd, in which the corresponding sections of the right eye, R, and the left eye, L, are located to view the object, O, upon the median line, MO. It is also assumed that the visual axis of the right eye, R, is faultily directed towards E, as in esophoria, so that its macula, m_2, is turned to the right; whereas, the macula m_1, of the left eye, L, retains its normal position with respect to the object, O; and, therefore, also with respect to the center, C, of the chiasmal field and the macula, M, of the *mean eye* on the median line, and to which points of orientation the *macular center,* m_2, in the right eye is also projected. Consequently, the macular centers, m_1, and m_2, in both eyes have the same points of orientation, C and M, in common, while the *image-center,* m_1, of the left eye *alone* is transmitted to these points.

But, the center of the image I_2, projected from O into the right eye, is situated on the left side of its macula, m_2, and is, therefore, transmitted with equal displacement so as to be located on the left side of the centers of orientation, C and M, in the chiasmal field and mean eye, respectively. Therefore, the displaced image, I_2, in the *right eye,* is transmitted to and located on the *left side* of the mean eye as the false cyclopean image, I; and it is this image, belonging to the right eye, that is homonymously projected to O_1, on the right side of and at the same prism-dioptral distance, EO, from the object O.

The points m_1, m_2, C and M are corresponding points with reference to the axis, PCM, of bilateral symmetry within the cranium, which coincides with the median line, MO, in the object-space and is directed to the supposed center, P, of image-perception in the brain.

In Fig. 2, heteronymous projection of the ocular images is illustrated. Both diagrams show that the chiasmal and mean cyclopean images, respectively, are contiguous, because the horizontal diameter of the object is made equal to the prism-dioptral deflection EO, so that the real object, O, and the mentally conceived *apparent object,* O_1, are also in contact.

The figurative mean cyclopean images, I and M, are graphically projected from their corresponding chiasmal images, so that *conjointly* they make it possible to pictorially illustrate either honomymous or heteronymous diplopia in a manner not hitherto lucidly accomplished.

Consequently, the *nodal point* of the "mean cyclopean eye," mentioned in 1884 by Hall and Hartwell (who more consistently used the median line instead of "the pin driven through the superimposed foveas" mentioned by Titchener) serves, in the writer's drawings, as the pole for the orientation, in any meridian, of the *directions of image-projection into the object-space;* whereas, the *chiasmal center* is the point for the orientation of the *distance between the transmitted dual ocular images,* in case separation or overlapping of them exists. Therefore, it is obvious that both of these imaginary points of orientation may be made to serve a useful illustrative purpose in physiologic optics; and, from a purely psychologic point of view, it only requires concentration of mind, reasoning power, and a little imagination to become a convert to this opinion.

Mr. Poffenberger's failure to recognize the need for the adoption of dual centers of orientation, as necessary adjuncts to the delineation of distance and direction, is an omission which might have been excused upon the mere ground of inadvertance, were it not that he specializes in the various propensities of the mind, as an instructor empowered to teach students of psychology at Columbia University. It is certainly unfortunate to be obliged thus to make effort to counteract, at least among impressionable students, misconception as to the intrinsic value of the figurative chiasmal image as a *working hypothesis* in making a lucid drawing, as well as a *figure of speech* when attempting to differentiate between the ocular images and their corresponding brain-images, whose actual locations and physical existence are not yet settled or fixed; therefore, also only a figure of speech, since the brain-image is just as imaginary as its correlative chiasmal image, which, at least figuratively, occupies a definite location.

In view of the indeterminate psychophysical character of these images, and an effort being made to picture them in a drawing, the delineator will at least need to assume that the center, P, of the so-called brain-image is the center of image-perception: that it is located in the horizontal plane, in juxtaposition to the center, M, of the centered cyclopean image of the object on the median line and, therefore, coincident with the center of the chiasmal image; said line, PCM, *within the cranium,* being considered the axis of visual orientation, or the directrix of bilateral symmetry of vision in the mind of the draftsman at least, if not in that of the psychologist.

However, no matter what misconstruction may have been placed by others upon the writer's association of the optic-nerve fibrils with a strictly figurative chiasmal image, the fact remains that, he has proven what the hitherto unknown dimensional proportions and distances between the mentally conceived dual images in binocular vision actually are when faulty deviations between the visual axes exist; though Mr. Poffenberger has not, in strict accordance with professional usage, been generous enough to admit it in a criticism which also indiscriminately covered more than the phraseology contained in the original article itself.

However, the writer is indebted to the editor of the Annals of Ophthalmology for an eminently fair criticism, especially when it is considered that the interdependence of the chiasmal center and the nodal point of the mean eye had not been previously disclosed, and which, for the purpose of making a lucid drawing in accordance with the rules of projection, must be considered as being located in planes that are at right angles to each other.

THE LAGRANGE SCLERECTOMY AND THE ELLIOT TREPHINE OPERATION.

BY PROF. DR. JOSEF MELLER OF VIENNA.*

ABRIDGED TRANSLATION BY WILBUR B. MARPLE, M. D.
OF NEW YORK CITY.

Prof. Dr. Joseph Meller of Vienna read a paper in September, 1913, which has recently been published in the Klin. Monatsblätter für Augenheilkunde (January, 1914). The paper is entitled, "The Sclerectomy of Lagrange and the Trephine Operation of Elliot." This paper is a report based upon the results of 389 Lagrange operations, and 178 trephine operations. Included in the paper is a report of the microscopical examination of 11 eyes enucleated (in several cases the specimens were obtained on the death of the patients from some intercurrent disease) after the Lagrange operation, and of 4 eyes removed or obtained after trephining. The cases were all observed carefully both before and after the operation

*From Klinische Monatsblätter fur Augenheilkunde, January, 1914.

so that up to the present time the paper is a unique one in respect to the number of cases operated upon, and the care with which the cases have been followed subsequently.

It has seemed to the writer that a resumé of Dr. Meller's conclusions (with which his own observations of the two operations have led him in the main to agree) would be of interest to the readers of THE OPHTHALMIC RECORD, and he therefore contributes such here.

He first makes some observations of a general nature concerning Elliot's operation, and describes E.'s present method of making the conjunctival flap (presented at the London Congress). As E. uses a 2 mm. trephine he is compelled to dissect far forwards. Meller says that we do not do an actual "splitting" of the cornea, nor is that to be recommended for the rigid and impervious outer corneal layers would at once partly close our opening. What we really do in order to obtain sufficient room for the trephine is to dissect or peel off the conjunctiva at the limbus up to its transition into the cornea. A point Elliot and Lagrange both emphasize is the importance of keeping as far forwards as possible away from the ciliary body.

One advantage of the Lagrange operation is that we can vary the size of the piece of sclera to be excised. for we can make the scleral flap broad or narrow by turning our knife more or less obliquely backwards in completing our section. With the trephine, however. we can not vary the size of the opening after once starting.

The great advantage of the Elliot operation is that its technique is so much more easy. The most difficult step in the usual iridectomy. that is the passing of the knife through a shallow anterior chamber with wide pupil. and often with cloudy cornea in a sensitive eye. and consequently a restless patient. is unnecessary in the Elliot operation. In performing the latter there is only a little pain when the trephine perforates, and at this moment it is not difficult to hold the trephine under such control that injuries of the deeper parts do not occur. In not a single case of Meller's 17 trephine operations was there an injury of the lens. The important point is to keep as far as possible forwards towards the cornea to avoid injury of the ciliary body. Meller's specimens show that the section always penetrates close in front of the scleral spur. and in one of the cases the ciliary muscle was injured.

M. prefers a 1½ mm. trephine with which one is less apt to get too far back. He refers to the remarkably clear manner in which Elliot has described all the complications which can occur in his operation. He follows Elliot's method of pressing somewhat more firmly on the corneal than on the scleral side, so as to cut through the former first. In excising the disc we may leave a small strip of tissue behind resulting in a partial closure of the trephine opening. We may not excise the iris far enough in the periphery in which complication is to be found one of the causes of iris incarceration and prolapse.

Meller prefers not to seize the scleral disc and iris at the same time as Elliot advises, but first to carefully excise the disc, and then do the iridectomy.

He does not agree with Elliot's suggestion in non-inflammatory cases of not removing the whole thickness of the scleral disc, in order to limit somewhat the freedom of filtration, for such a procedure might lead to a subsequent complete closure.

He agrees with Elliot's suggestion to begin the use of atropin soon after the operation on account of the insidious iritis. He next turns to a comparison of the results of the two operations, Lagrange and Elliot, and finds that the latter offers the same chances for the production of an oedematous, cystic filtering cicatrix (which according to Lagrange is the most favorable form) as the Lagrange operation, while the danger of an ectatic scar after the former is less than half as great. Furthermore, an ectatic cicatrix is a much less serious affair after trephining than after the Lagrange.

Meller divides his cases into two groups, "A": Those in which the sight was preserved, or if that was already lost, where the globe was preserved with normal tension "B": All cases terminating badly.

Group A, good results	69% Lagrange
	72% Elliot
Group B, bad results	8.4% Lagrange
	2.4% Elliot

That is the chances of a good result after the Elliot are just as good as after the Lagrange, while the chances of a bad result are less than one third what they are after the Lagrange.

Complications such as lens opacities, severe iridocyclitis with atrophy of the globe, expulsive hemorrhage, etc., not at all infrequent after the Lagrange, are scarcely met with after trephining. There is a tendency after both operations for the iris to fall into and heal in the wound, and thus block up the opening, especially (in the Elliot) after a peripheric iridectomy, or peripheric incision of the iris. He operated in this latter manner (peripheric incision) in 8% of the trephining cases, and these cases furnished 46% of the iris prolapse.

If the Elliot operation is done with a complete or peripheric iridectomy the danger of iris prolapse is certainly not greater than after the Lagrange.

The percentage of vitreous loss is a little greater after the Lagrange (3.4%) than after the Elliot (2.8%). But vitreous prolapse after the Lagrange is a much more serious complication than the escape of a bead of vitreous from a small trephine opening.

As to the genesis of relapse, it is instructive to compare the number of relapses after the two operations, in relation to the method in which iridectomy was performed. Here are the figures of such relapses:

	Relapses	
	Lagrange	Elliot
Total Iridectomy	9.3%	7.5%
Peripheric Iridectomy	11.8%	18.7%
Without Iridectomy	20 %	23 %

A comparison of the simple incision of the iris cannot be made as this which is done in the Elliot is never done in the Lagrange operation.

It is evident, therefore, that the less the iridectomy is done, the higher becomes the percentage of relapse, which shows that the iridectomy is not such an unimportant element in the success of the sclerectomy as the champions of the "ectomy" methods would have us believe inasmuch as they insist that the iridectomy in their methods serves only to prevent prolapse.

The effect of the iridectomy is more noticeable in the trephine than in the Lagrange operation, which may have some bearing on the question as to how much "filtration" really contributes to the regulation of the tension. The long scleral incision and the excision of a larger piece of sclera assures for the Lagrange operation a greater influence on the intraocular pressure regardless of the iridectomy, while Elliot's operation with its smaller scleral opening suggests a greater dependence upon the iridectomy.

With an equally high percentage of excellent results, the Elliot operation has a relatively much smaller percentage of bad results than the Lagrange. Further points in its favor are the considerably easier technique, the much smaller number of complications, especially in those forms of glaucoma in which the usual iridectomy was always feared—the severe forms of acute and absolute glaucoma. It is exactly in these latter cases that we frequently succeed with this operation in relieving the patient of his pain, and putting an end to the other deleterious results of increased tension without having to proceed to enucleation of the eye. That we can cope with many more cases of absolute glaucoma by the Elliot operation without being exposed to the various severe complications which unfortunately are well known to every operator is evident from the fact that of the whole number of cases that we trephined, 7.7% were cases of absolute glaucoma, while in only 3.4% of absolute glaucoma cases did we dare to do a Lagrange operation. Also from the fact that with the Elliot operation only 15.4% of the absolute glaucoma cases ended badly, while 38% of such cases were entirely lost after the Lagrange operation.

Late Infection.

As to the question of late infection, both Lagrange and Elliot have stated in their last reports at the London Congress (1913) that they never saw a case. My statistics show 1.5% of late infection after the Lagrange and 1.7% after the Elliot trephining. Two of the Lagrange cases were done with a round (peripheral) and four with a complete iridectomy. It is really rather surprising that the wound which lies protected behind the healed and intact conjunctival flap, can serve as the portal for the entrance of micro-organisms. It is by this demonstrated that the organisms in some way penetrate the flap, and it is evident that such an opening in the outer capsule of the globe is attended with a certain amount of danger to the eye under all circumstancs,—even when the iris does not lie in the opening. When the micro-organisms have once passed through conjunctiva, there is then nothing more to oppose their penetrating further into the eye. Of course it can not be denied that the incarceration of the iris favors their development, and offers an easy path to their further advance into the globe, which explains why it is just in these cases of iris incarceration that the infections are most apt to take place. I have already referred to these conditions in my first article, although I had not then seen a case of late infection. I stated there that the epithelium covering the cicatrix could not be in the best condition, and could be easily injured, as it is constantly exposed to various mechanical traumatisms on account of its projecting cyst-like shape. In some cases the infection has run a mild course, but in the most it goes on to the destruction of the eye by involving the posterior section of the globe.

I should like here to compare my own results with those of Lagrange as I see from an observation of his in the Report of the London Congress that he cannot corroborate my observations published in my "Ophthalmic Surgery." and says concerning the complications mentioned by me that he has observed nothing similar in the hundreds of cases on which he had up to the present operated, "et pour obtenier les mêmes resultats que nous les operateurs n'auraient qu' à suivre les indications techniques que j' ai si souvent donnees." Lagrange according to his own reports had in so called chronic glaucoma 86.4% of successes, and 13.6% of failures; in glaucoma simplex 84.4% of successes, and 15.6% of failures. One can compare with these my failures, which were 10.7% in chronic, and 8.4% in simple glaucoma.

Indications.

The situation so far as the indications are concerned has been simplified to an extraordinary degree by the introduction of the Elliot operation. It is indicated in all cases of glaucoma, in acute as well as in chronic and simple; in secondary glaucoma, and especially in those cases of increased tension, which have developed after the performance of other operations. The operation can likewise be recommended for Hydrophthalmus, for it is attended with less danger than an iridectomy, or even a sclerectomy.

The height of the tension has no effect upon the course (details) of the operation, or upon the development of complications, especially not that bad effect which a high tension must have in all those methods of operating in which the eye is opened by a section.

The other methods of operating will not be supplanted by it. Nor can the Elliot operation guarantee us in all cases a good result; with it also there are losses enough; with it also one is still powerless in many cases of glaucoma, and must then resort to some other method in order to accomplish our object, the reduction of the tension to the normal. Furthermore, after a trephine operation (as after all other methods) a case of glaucoma which was previously quiet and progressing only slowly, may have its course changed into a rapid and malignant one. But from our clinical experience after a careful study of our cases we have definitely decided to abandon the Lagrange in favor of the Elliot operation. Nevertheless, we do not think that Lagrange's service is by this in any way lessened. It was he who first carried into practice the bold idea of securing premanent filtration of the eye by the excision of a piece of the sclera in the region of the anterior chamber. In this sense every anterior sclerectomy continues to be the method of Lagrange. With the introduction of the Elliot trephine for this purpose the Lagrange sclerectomy was only very much facilitated and bereft of most of its dangers.

In conclusion the question arises: Is the Graefe iridectomy to be entirely displaced by scleral trephining? This question seems to presuppose a great difference between the two methods of operation, as is in fact the case. Scleral trephining is so to speak a convenient, technically easier and less dangerous way of obtaining access to the iris in order to excise it at its root after the dictum of von Graefe. That the fistulization of the eye secured by it at the same time represents an additional curative factor forms certainly an advantage of trephining which is not to be underestimated, and which is especially adapted to those cases of glaucoma (for example, to glaucoma simplex) in which the usual iridectomy can not be depended upon. The skilled operator will stick to the approved Graefe iridectomy in those cases of glaucoma in which this operation, as has been proven, almost always produces the desired effect, but he will prefer to trephine in the cases mentioned above (high intraocular pressure, advanced degree of glaucoma, complicated cases of secondary glaucoma, etc.)

If a number of disadvantages and complications of both forms of sclerectomy have been here described, we should not forget that such belong in no less a degree to von Graefe's method; that indeed it was for just that reason that we have been continually searching for new methods of operating in glaucoma. It would be a mistake to lay the blame for all the disadvantages which have been described, to these methods, and not equally to the Graefe iridectomy.

In order to be able to establish a more certain comparison between the two methods discussed here and the von Graefe iridectomy, (the data present in the literature bearing on the results of the von Graefe operation are too unreliable), Meller proposes to work up in a similar manner the cases of glaucoma operated during the same years in his clinic by the method of von Graefe (which were therefore operated on under the same external conditions, and almost all by the same surgeons), and at some future time to report the result. Only then will we obtain a positive survey of the results of the three methods.

Perhaps then the indications for the different methods may be more accurately decided.

ON THE TREATMENT OF SYMPATHETIC OPHTHALMIA WITH ATOPHAN OR NOVATOPHAN.

BY H. GIFFORD, M. D., OMAHA, NEB.

Since the publication of Nicolaier and Dohrn in 1908, in which the phenomenal increase of the output of uric acid under the influence of atophan was described, there has been quite a copious output of literature on its use in gout and rheumatism, but I have not seen any reference in current ophthalmic literature to its use in eye diseases; and I was first led to use it in cases of ordinary iritis by an indirect suggestion from Dr. Wilder of Chicago. In about twenty cases of iritis treated since December last, I have found it to be fully the equal of the salicylic preparations in controlling the inflammation, and in some cases, notably one in which the iritis was associated with gonorrhea, its effect was very prompt after salicylate of sodium had been used for several days with only moderate benefit. Its effect on sympathetic ophthalmia, however, is what has made the deepest impression on me. It has been used by my colleague, Dr. Patton, and myself in four cases of this disease, partly as a substitute and partly as an alternative, and the results have been, on the whole, superior to those obtained with salicylate.

In one case where the patient developed so violent a delirium after taking salicylate for a few days that it was out of the question to give it further, the atophan was used with a rapid subsidence of all signs of inflammation. The vision rose from about fingers at 5 ft. to 20/70, with nearly free pupil. On his departure from the hospital the eye had been entirely free from inflammation for nearly a month, and I unfortunately thought that all danger was over. About six weeks after the atophan was stopped, he had a relapse and on his return I found the pupil nearly secluded. Resumed treatment with atophan promptly controlled the inflammation, and the adhesions partly gave way. He is still under treatment with a perfectly white eye and vision 15/200.

In two other cases the atophan was successfully used as an alternate with the salicylate, after the inflammation had been largely controlled by the latter.

In the fourth case the patient developed the disease after an operation in which the small nucleus of a Morgagnian cataract had to be left in the anterior chamber. Although atophan and salicylate were both freely used the inflammation slowly gained ground until an injection of neosalvarsan was given. This produced a decided improvement* and since then atophan in daily doses of 90 grs. by the mouth with the 120 grs. by the rectum, has held the disease in check, but if it is discontinued for a day the congestion increases. So the final outcome is doubtful. On the whole I can say that in all inflammations of the uveal tract the atophan is fully as effective as the salicylates and their derivatives; and as a rule a smaller dose is required for a given effect. Furthermore, while it sometimes bothers the stomach, it produces practically no tinnitus, sweating nor fullness of the head, and the only reason that I can see for not substituting it entirely for the salicylic compounds is its high cost. An ounce costs $1.50, novatophan 25 cents more. The latter is tasteless and perhaps less likely to upset the stomach.

With regard to the dosage, I find as with the salicylic compounds, that in severe cases it is both necessary and safe to use much more than is commonly recommended. Forty-five grains a day, and exceptionally 60 grs., is the dose recommended, but I have had no difficulty in following the same rule as that which I have recommended for salicylate and aspirin; namely, give a grain a day for each pound of body weight, and in exceptionally bad cases a third more. In the fourth case referred to above, I have been giving this man of 75 years, weighing about 170 lbs., 210 grs. a day, half by the mouth, half by the rectum. He stands it very well, much better than he does the same amount of salicylate. In this case I have given 120 grs. of bicarbonate of soda a day; but in many other cases I have given 150 grs. a day without soda or inconvenience. There has been no sign of an excessive deposit of urates in the kidney which Weintraud feared on theoretic grounds. Although the circulation seems to be but little affected by the atophan, I follow the salicylate rule of keeping my patients in bed, at least during the latter half of the day, and have given two drachms of brandy with each of the last three 30 gr. doses. Also a glassful of water before and after each 30 grs. by the mouth. How high it will be found safe to go in extreme need remains to be seen. The lethal dose of atophan for the dog is given as 0.6 grm. for each kilo of weight. This means about 4 grs. to the pound. From the slight effect produced by 240 grs. I think it must be less poisonous for man than for the dog. A general account of atophan and novatophan with a formidable bibliography, can be had on application to Schering & Glatz, 150 Maiden Lane, New York City.

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* It should be noted that subsequent injections of neo-salvarsan had very little effect on the inflammation.

CONJUNCTIVAL HEMORRHAGE IN TYPHOID.

BY Z. C. LAYSON, M. D., HINTON, W. VA.

On Dec. 31, I was called to see Mr. E. W., aet. 25, a typhoid patient at the Hinton Hospital. He had been confined to bed with typhoid since Dec. 6. During this time he had had repeated attacks of epistaxis and since Dec. 19 had been having an intestinal hemorrhage every two or three days. Small amounts of blood, also albumen, were detected from time to time in the urine. I was called because the epistaxis had grown so profuse and so annoying to the patient that it was considered best to pack the nares. This done the hemorrhage ceased. On Jan. 3 the attending physician again summoned me, stating that he believed that the blood was being forced from the naris through the puncta of the right eye. At that time the nares were packed. Upon examination I discovered that the blood, instead of being forced through the puncta as the physician supposed, was coming from the conjunctiva tarsi of the upper lid. The hemorrhage was capillary and quite profuse. It was controlled by moderate pressure but recurred during the next three days, whenever the pressure was discontinued. 20 c. c. of normal horse serum was administered hypodermically after the beginning of the conjunctival bleeding. Prior to this the patient had received two 20 c. c. doses of the serum. On Feb. 10, after the patient had recovered sufficiently to be able to spend most of each day sitting up, I examined the fundi. There were to be seen in the retinae four small areas of partly absorbed hemorrhage.

No history of a hemorrhagic diathesis was obtained.

The University of Minnesota, Medical School, is to offer a course for the preparation of specialists in ophthalmology, covering a period of two or three years, this course to start July 1st, 1914. Opportunity will also be provided for a course in Otology, Larynology, and Rhinology to be taken at the same time. It is planned to grant a suitable degree in ophthalmology at the expiration of the service, provided the work done is satisfactory. The plan provides for a systematic training, covering laboratory branches in so far as they are related to ophthalmology, and the intention is to give the student a good foundation in these allied subjects, both laboratory and clinical, including anatomy, physiology, pharmacology, pathology, bacteriology, general medicine, surgery, experimental and clinical, neurology and other clinical branches.

It is expected that this course will prepare the student more quickly and in a better manner in subjects related to ophthalmology than would be the case were the physician to enter upon a long period of general practice where the physician is obliged to do much work which later will be of little or no value in the practice of his specialty.

There is one teaching fellowship offered of $500 for the first year and it is expected that the amount of the fellowship will be somewhat larger for the second year of service.

Application may be made to the Dean, Medical School, University of Minnesota, Minneapolis, Minn.

PRACTICAL VALUE OF ROUTINE BACTERIOLOGICAL EXAMINATIONS OF THE CONJUNCTIVA.

BY WALTER H. SNYDER, M. D., TOLEDO, O.

I have frequently been asked if I considered the time spent in a bacteriological examination of the secretion from inflamed eyes gained me sufficient knowledge to pay for the trouble. I may briefly state that I find it of sufficient value to continue. I am fully aware that the findings are partially disregarded in some of the best hospitals in this country, but nevertheless the very men whose practice we are most apt to depend upon for new ideas are the ones who keep in close touch with the findings, although at times apparently disregarding them.

The question whether these examinations are worth while or not becomes a rather personal one. To the man who is willing to do almost any reasonable amount of work to gain a small percentage of increased efficiency they are invaluable. Other men who are not methodical in their technic and who think they can make an absolute diagnosis of conjunctival conditions by the eye alone, consider that they are not repaid for the labor of the examination. This might be true if the work were not done in the office in which it originated or if a moderate fee even had to be paid for the work. My own position is that if in one case a month I am enabled to reduce the morbidity and make a correct diagnosis earlier than I otherwise would, it is worth all the trouble of attending to the other cases which do not seem of so much value. I think most of the men who have tried it and given it up are those who have not been able to arrange it in an easy yet satisfactory manner. If you will permit me, I will give you the manner in which this work is done in my office.

On the treatment table we have a Coplin staining jar, which holds a dozen sterile slides, each with a little label across one end. The staining jar also contains a broach holder three inches long, containing in its jaw an irido-platinum wire soldered into an oval loop. This is also sterile. We have a small bottle with dropper stopper, containing sterilized water. A case of acute conjunctivitis comes in and it is desirable to know the flora before starting treatment. After the vision is taken (which in our office precedes any manipulation of the lids, etc.), two drops of distilled water are placed on the slide, an inch apart. The platinum loop is stroked over the conjunctiva and the secretion mixed with the drop of water. This is repeated in the left eye, and the slide, marked with the patient's name and serial number, is sent to the laboratory. By the time the history of the case is taken and the muscles tested, a lay assistant (if there be sufficient work to justify this help) can have this slide stained and under the microscope, ready for a glance by the doctor. We keep a laboratory record of all these cases, and my secretary, later in the day, when the history is typed out, will mark in its appropriate place what the smear shows. The work is of such small moment that the time is hardly missed and the minute taken to look the field over is well spent. There is a growing tendency to ignore the old clinical names for inflammations of the conjunctiva. It is still within the facts to state that at least two-thirds of all the inflammations of the conjunctiva are caused by bacteria. And an inquiry as to whether the inflammation is caused by chemical means or infections or a physio-chemical irritation is about all that can be satisfactorily done by a macroscopic examination. When he asks himself whether the inflammation is acute or chronic, whether a catarrhal one or purulent, a physio-chemical irritation or a bacterial infection—this is about the limit to which one can truthfully diagnose inflammations of the conjunctiva.

Personally, however, I can say that I have learned a great deal about conjunctival infections and their appearances since I have made it a rule to make examinations of every conjunctivitis (by this, however, I do not mean the slight conjunctival inflammations which are found in all urban dwellers, and which are of but slight moment). It is interesting to note in how many instances the infection is apparently more serious than the clinical condition of the lids would indicate. The reverse is also true, and I am firmly convinced of the fact that we will treat our cases more intelligently and with better results if we are aware of the cause of the infection which is present.

The next question is the relative value of smears and cultures. My own experience leads me to say unhesitatingly that for the purpose of the clinician smears are more important. Axenfeld, who, as you know, is one of the leading ophthalmologists who has paid special attention to bacteriology of the eye, says: "In many cases a simple smear preparation is more useful than a culture because many pathogenic organisms very obvious in the former only develop badly in the latter, and are overgrown by casual bacteria of no importance." His text book has been my constant guide and I am happy to say that my experience coincides absolutely with the above statement. Occasionally cultures are necessary, but for the most part diagnosis from films, especially if the Gram stain is used, is sufficient for all clinical purposes. It is necessary to culture when a Gram negative diplococcus is met with in a simple catarrh or on an apparently normal conjunctiva. In other words, where an apparently serious infection is growing on a normal surface or where the clinical facts do not bear out the bacteriological findings. Cultures are also necessary for the differential diagnosis of the diphtheria bacillus from the bacillus xerosis. In fact, it may be said that the normal conjunctiva contains regularly or almost regularly the so-called xerosis bacillus and a non-virulent or slightly virulent white staphylococcus. And I might here insert a word of caution as to the bacillus xerosis or the pseudodiphtheria bacillus. It is more than probable that these pseudodiphtheria organisms are closely connected with the true diphtheria bacillus, but so far we are unable to state just what this difference is. But the polar stain can be found in the bacillus xerosis, the variations of its size and shape depending largely on its culture media. And it is in this infection even more than the gonococcus that the cultures will be necessary to identify the *causative* factor. But in these instances one should protect the interests of the patient and our own reputation by beginning treatment as though the worst organism were the causative factor; namely, gonorrhea or diphtheria. Axenfeld closes his introduction with these words: ''Those who do not freely examine for bacteria in practice will not assist their patients in many of the ways which are possible.''

A few words about the instruments necessary, because I am especially hoping to interest ophthalmologists who have not as yet been doing this work. The objective of course is the Oil Immersion, and the best your pocket will afford. If you are to buy a cheap one, be sure to have a careful test made by a competent observer. One can occasionally get a good objective from a poor maker, but the best makers of Immersion objectives never let a poor one pass to their salesrooms. As to the stain. —various ones are chosen. Perhaps the one you should start with is Gram. The Gram stain instantly divides all bacteria into two classes and automatically identifies by its color some of the most confusing comparisons you will have to make. After you are more expert you will be able to make this identification with a single stain. Some laboratories use methylene blue and some fuchsin; probably Loeffler's alkaline methylene blue would be better for the little-used laboratory, as it keeps better and stains quite promptly. I have found it advantageous to use small TK dropper bottles (15 cc.), making the stains up as a saturated alcoholic solution. The work will not be enjoyed nor made of use unless it can be reduced to the minimum of annoyance and the work can be made a pleasure and assistance if attention is paid to this particular in equipping one's laboratory. Some of you will have trouble in fixing the film. Lay assistants frequently overheat the film, causing changes which are very serious. This can be obviated by using absolute alcohol, a drop being put on the film, and being allowed to evaporate.

Among the cases in which a microscopic examination is particularly useful is the early recognition of a Koch-Weeks epidemic and the differential diagnosis in a Morax-Axenfeld infection, as to whether zinc or silver shall be the drug used. To those of you who are doing ear work the identification is more important in certain cases. If in an acute otitis media the infection is caused by the streptococcus mucosa capsulatus, it is invaluable information to know that this deadly germ is at work. And here it would be well worth while making hundreds of examinations without direct gain to have the invaluable information as to this infection before giving a favorable diagnosis. I cannot refrain from stating that the prevalent belief (even in medical circles), that all ophthalmia neonatorum is caused by gonococcus, would not have gained currency had more ophthalmologists made smears of these cases. And I am well within the experience of good clinicians when I say that no one can with certainty make a diagnosis of conjunctival infections from the clinical findings alone. The last two years we have been examining microscopically every case of ophthalmia neonatorum that our nurses could find in a city of 180,000, and the gonococcus is far down in the list of causative factors. The worst and most persistent case we have ever had was caused by the streptothrix. In looking over the table of infections you will notice some which will seem to be classified inaccurately, but each laboratory worker has a standard of his own as to what constitutes a "mixed infection" and "streptococcus" and "pneumococcus," although it is common to find all these germs on each slide. Therefore, when I say that it was a "pneumococcus infection" I do not mean that it is the only germ present, but that it was present in such quantities that in my opinion it was the one which was the infecting bacteria. The "reaction after silver" is a well-marked picture, which you will soon be able to recognize. During this period there have been no well-marked epidemics of "pink eye," which is usually a Koch-Weeks infection. But some of the pneumococci and streptococci would justifiably have been called gonorrheal if only the amount of discharge and the color had been taken into account. The history of the case would often allow one to differentiate, but not the macroscopic findings.

I offer for your consideration the results of the bacteriological examinations made in my office from January 1, 1912, to May 1, 1914. It is interesting to note that about one-third of these were negative, and I shall explain what is meant by "negative" in these findings. "Negative" does not mean that there are no germs present, as probably many of you know there are germs present on every normal conjunctiva. I mean by a negative finding that there are not sufficient bacteria in the smear to reasonably account for the condition as seen clinically. Anyone who has examined many smears will understand this perfectly. but the idea should not be gained that a smear can be taken from even a normal eye without showing many forms of germ life.

Results of Bacteriological Examinations of the Conjunctiva.
(Jan. 1, 1912, to May 1, 1914.)

1.	Friedlander's Pneumo-Bacillus	1
2.	Gram Negative Bacillus	1
3.	Gram Negative Diplococcus	1
4.	Koch-Weeks	1
5.	Leptothrix	1
6.	Sarcina Tetragena	1
7.	Streptothrix	1
8.	Influenza	2
9.	Morax-Axenfeld	3
10.	Reaction after Silver	11
11.	Mixed Infection	15
12.	Gonococcus	20
13.	Staphylococcus	22
14.	Pneumococcus	32
15.	Streptococcus	36
16.	Negative	55
	Total	203

REPORTS OF SOCIETIES

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of Monday, January 5, 1914.

DR. S. LEWIS ZIEGLER, CHAIRMAN.

Glaucoma.

Dr. S. D. Risley presented a case of simple glaucoma which had resulted in blindness in the right eye and then became painful from an attack of acute inflammatory glaucoma which had been relieved by a trephining operation done by a colleague in Philadelphia. She came under Dr. Risley's care because of failure of sight in the left eye with marked contraction of the field of vision and T. = 44. He had done a peripheral iridectomy and presented her with a normal tension and freedom from pain. He called attention to a fine circle of pigment spots on the anterior capsule of the lens, shown only in the coloboma, showing that what had appeared at first sight to be a simple glaucoma was after all a case secondary to general uveal disease. There had been no iris bombe. He thought she was an illustration of a group afflicted with so-called simple or non-inflammatory glaucoma which were nevertheless associated with low forms of uveal disease and he thought sustained the same relation to inflammatory glaucoma that certain forms of arthritis deformans bore to acute rheumatism.

DISCUSSION. Dr. Zentmayer: I should like to ask what has been the effect of the trephining operation upon the other eye? As some time has elapsed since the operation it would be of value to know. In a case of this kind I should expect that it has had but little effect. It seems to me that iridectomy is the operation of choice.

Syphilitic Iritis.

Dr. Risley presented also a case convalescing from a violent attack of syphilitic iritis, who had come to the clinic with a large nodule on the iris and with marked plastic adhesions to the anterior capsule. The man had rapidly recovered under the use of mercurial inunctions, the eye being, when shown, nearly white. He was brought, however, to demonstrate the presence of two white dots in the membrane of Descemet, circular in form and not more than ½ mm. in diameter. These dots had appeared only within the last 48 hours. Dr. Risley did not remember to have seen just such a deposit in the presence of any form of uveal disease.

Mules' Operation.

Dr. Risley exhibited a patient upon whom the Mules' operation had been performed a week before. He urged the necessity of not removing the bandage after this operation for at least 48 hours, since if removed earlier the lids became puffy almost suddenly and the conjunctiva oedematous, a condition which did not occur, certainly in the majority of cases, if a firm bandage were allowed to remain.

DISCUSSION. Dr. Ziegler emphasized the need of maintaining pressure on the socket both in enucleation and in implantation, in order to prevent oedematous infiltration into Tenon's capsule, which was so liable to stiffen the eye muscles and later cause poor socket movement. To illustrate this, he exhibited a case of implantation of a gold ball, in which each muscle had been caught up separately by a suture, and all tied together. The bundle of threads was allowed to lie loose on the lower lid for purposes of drainage and easy removal. Elastic pressure was then made by three reef sponges and a pad of gauze, covered by a tight bandage. This dressing was removed daily and elastic pressure continued for four days. The sutures will be removed at the end of a week or ten days. The eye was injured by an air gun carrying a B. B. shot which perforated the globe by entering through the ciliary body and passing out through the sclera behind. The X-ray showed it was resting near the optic nerve, and it was found there when the eye was removed. The socket already had a good movement.

Tubercular Keratitis.

Dr. Risley showed three cases of chronic corneal disease, each of whom had been under treatment for long periods of time at various clinics resulting in temporary improvement but followed by speedily recurring exacerbations. There were nests of deposits in the cornea, little gray areas, 1 or 2 mm. in diameter over the membrane of Descemet. There were phlyctenules along the margin of the cornea in each case and in one the cornea was vascular. The Von Pirquet test proved positive in all of the cases and they were all making a speedy recovery from the ocular disease and showed great improvement in their general health under the injections of Old Tuberculin. The doses had been steadily increased beginning with 1/500 of a milligram and steadily increased up to 1/250 or higher: the object being to avoid any local reaction. In each case the dread of light had disappeared, the appetite had improved and they had gained in weight. The third case was an example of uveal disease. The submaxillary glands were enlarged; there was ciliary injection, but study of the fundus was impossible owing to the deep infiltration of the vitreous. She was a victim of impaired health with precarious appetite, but there was no demonstrable pulmonary lesion. The Von Pirquet test proved positive and she received as in the other cases the slowly ascending doses of Old Tuberculin. Her general health had greatly improved, the vitreous infiltrate was steadily absorbing, so that a very much blurred image of the fundus could be made out and she had a corresponding improvement in her vision. Dr. Risley said that he believed that this patient furnished an illustration of the fact that many of these cases of obscure uveal disease were the result of unrecognized tuberculosis. In all of the cases shown the injections of Tuberculin were administered three times weekly.

DISCUSSION. Dr. C. J. Kistler said that the history of Dr. Risley's case of phlyctenular keratitis had interested him very much on account of the experience he was passing through at that time. His own experience had been very much the same as Dr. Risley had had in this case. The patient was a young girl who had also enlargement of the submaxillary and cervical glands; she never had any symptoms of pulmonary tuberculosis. A Von Pirquet test was made and the response was very violent as though she had been vaccinated for smallpox. Her arm was quite inflamed showing red streaks of lymphangitis. Since that time instead of getting better her eyes have been very bad indeed. She is a telephone operator and has stopped work because she could not bear the lights at the board. The question arose as to what to do in such a case—to let her go until the reaction had subsided or whether to use the tuberculin injections while in this condition.

Dr. Brinkerhoff said that in Dr. Risley's case of tubercular keratitis, the initial dose of Koch's Old Tuberculin administered was 0.05 mg. which was gradually increased to 0.02 mg. He said that in the case of Helen, when the dose reached 0.02 mg. there was a reaction; the patient having fever, headache and malaise. The dose was decreased in size, the symptoms then subsided and that her eye condition had since that time rapidly improved. Dr. Brinkenhoff said that he rarely had an extreme reaction with the Von Pirquet reaction, and that there was generally a hyperemia around the site of the tuberculin injection, which rapidly disappeared in a few days. He said that in Dr. Kistler's case, the scarification had probably become infected.

Dr. Kistler said that as for an infection, he did not think there was a mixed infection at or outside the vicinity of inoculation with Tuberculin, because he had done a great many Von Pirquets and would have recognized this. There was usually no trouble and but little redness and swelling. This case was entirely different. He was always careful after doing an ordinary Von Pirquet to cover up the points of test and had never had any mixed infection; this would be the first and he felt quite positive the intense reaction was not due to a mixed infection.

Eye Injuries.

Dr. Risley reported two cases of injury from the impact of a small bullet projected from an air-gun, in which the blow had apparently been received upon the closed eye-lid. In one instance the vitreous was found filled with exudate, so that no study of the fundus could be made. The ball was transilluminable in all parts of the field except below. After the absorption of the exudate under rest in bed, cold compresses and atropin, a large rupture of the choroid was found at the posterior pole between the macula and nerve and concentric with the nerve border. In the second case there were three ruptures. When seen both cases had had a hemorrhage in the anterior chamber. These cases were brought forward to illustrate the fact that though these missiles from a child's toy air-gun are small that they may nevertheless produce grave injuries to the eye.

Symblepharon.

Dr. Ziegler exhibited a case of symblepharon of the upper lid following a burn on which a Berens operation had yielded a moderate result but contraction again occurred. He then did an extensive conjunctivaplasty, removing the tissues from the cornea and freeing the globe above. The flap was turned back toward the retrotarsal fold and sutured through the upper lid. A double armed suture was then buried in the sclera near the upper limbus, brought out through the lower lid and tied through a pearl lid plate, thus drawing the cornea far down and putting the severed tissues on a stretch. The conjunctiva on each side of the open wound was then dissected loose and bridged across the scleral gap. Already there is good movement of the globe, the upper cul-de-sac is normal in appearance and the cornea is perfectly free. The silk sutures buried in the upper and lower lids were passed through pearl buttons placed on the skin surface and tied with bow knots so that one can either readjust for swelling or reef in the slack as the oedema disappears.

Incised Wound of Globe.

Dr. Sweet exhibited a boy, aged 12, who had an incised wound of the eye-ball, about 8 mm. in length, which extended through the cornea and sclera in the lower portion of the globe. The injury was caused by a large piece of glass falling from above, which cut the cornea and iris obliquely, leaving a large gaping wound. The extensive character of the injury seemed to point to enucleation as the ultimate result, but, as the lens did not appear to be injured, it was decided to endeavor to save the eye, and a Kalt suture was inserted, drawing the wound edges in apposition, and over this was drawn a large conjunctival flap. The conjunctival tissue remained firmly in position, and all injection has subsided. Vision with a low myopic correction equals 20/30 The results of the treatment in this case emphasize the value of suturing of the cornea and the employment of the conjunctival flaps to cover large wounds of the globe.

Lamellar Cataract.

Dr. Sweet also showed a boy, aged 6 years, with congenital lamellar cataract of unusual form, exactly similar in appearance in each eye, although discission had been performed in the right eye. The periphery of the lens was clear, but the nuclear portion showed a faint dark ring, only clearly shown by oblique illumination, and in the center of the disc-like area was a dense brilliant white three-point star, from the middle of which extended forward to near the anterior capsule a white tubular opacity. An elder brother was in the hospital at the same time, with a similar but larger binocular lamellar cataract, but without the central polar opacity. Some years previously a sister was operated upon for lamellar cataract in each eye. The mother had normal lenses, but the father had had poor eyes, the exact nature of which is not known. He had never had an operation upon the eyes.

J. Milton Griscom, M. D., *Secretary.*

TRANSACTIONS OF THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

January 8, 1914.

Use of Cold and Heat in Ophthalmic Practice.

Dr. Luther C. Peter pointed out that cold is a depressant: it retards the circulation, delays cell activity, is analgesic, and to some extent, bactericidal. Heat is a stimulant; it quickens the circulation, renders cell life more active, is a sedative, and in high temperature, is analgesic and of some bactericidal value.

As to the method of application. Water furnishes the ideal medium through which heat and cold may be applied. Text books refer to their application in the form of coils, the Japanese "hot-box," hot water bag, electricity, etc. There are few conditions, however, if any, which do not admit of moist heat: and the student in ophthalmology will do well to restrict applications to water.

DISCUSSION. Dr. Zentmayer said that he had hoped to hear from Dr. Peter how much the temperature of the conjunctival cul-de-sac can be altered by the application of compresses to the lid. Dr. Peter explained the relief from pain obtained from the use of cold compresses to the analgesic effect of the cold on the peripheral nerve filaments. While this may be the true explanation, he was of the opinion that it was more likely to be due to the relief of the congestion. While moist heat fulfills the requirements best in inflammatory conditions the application of dry heat by means of the Japanese box serves better when you wish to keep up the vitality of a graft. It maintains for a long time a steady slight elevation of temperature. Dry heat is occasionally found more soothing than moist in iritis. An application of cold water, which is said to be as efficient as it is heroic, is the dousing of the head in cold water to relieve the intense blepharospasm met with in phlyctenular disease of childhood. In indolent central corneal ulcer of childhood in which the pupil fails to dilate under atropin, stimulation of the ulcer and absorption of the cycloplegic can be secured by holding the pipette containing the solution over a lamp until it begins to boil and then dropping the solution upon the ulcer.

Dr. Appleman called attention to a point mentioned by Dr. Peter, namely, of slightly warming the drops before using. It is not enough to give a prescription and tell the patient to wash the eye, or drop the medicine into the eye, at stated intervals. They should be told to warm the solution before using, as, even at room temperature, a drop of solution allowed to fall on the eye from a short distance above it feels very uncomfortable, the more so if the solution has been chilled, in cold weather, in the journey home or from the drug store. The patients should also be told how to hold the head, how to open the lids, whether to use an eye cup or a dropper for collyria: especially in treating children should the parents be told in minute detail how to carry on the treatment at home.

Care in these minute details tends to create the impression in the minds of patients that the physician is careful, interested in, and alive to overcoming the difficulties of the case.

Dr. Reber: The question as to whether hot or cold applications are to be used in a given case has always been a matter of great contention. The general principles underlying the use of both hot and cold have been most beautifully laid down by Dr. Peter, but as usual there are exceptions. For instance most authorities prefer the use of cold applications in the early stages of conjunctivitis and inflammatory lid troubles and hot applications in all other external diseases. In iritic disturbances it is the almost invariable rule to use hot applications and yet there is an occasional case that seems to get more relief from cold applications. Similarly here and there will be found an authoritative worker who prefers almost constant hot applications in ophthalmia-neonatorum, notably Dr. Myles Standish, of Boston.

In all traumatisms about the eye I am devoted to ice with atropia and argyrol combined with a course of calomel internally. I believe that if this were generally laid down as the proper treatment in all traumata that many eyes would be saved. I think we are also apt to overlook the fact that any surgical operation is also a trauma. That in extensive intraocular operations this very same treatment should be of great value. Dr. Zentmayer's suggestion of a drop of almost boiling hot atropin solution directly upon the corneal ulcer appeals to me strongly and I shall use it at the first opportunity. Hot normal saline solution in a very fine stream has been used by someone as a curette for corneal ulcers. I have forgotten just who it was but I can endorse it as a most efficient method.

Interstitial Keratitis.

Dr. Leighton F. Appleman said that "Interstitial Keratitis" occurs most frequently between the ages of 5 and 20 years—in the majority of instances as a result of hereditary syphilis, according to some observers in from 60 to 80 per cent. of the cases. Acquired syphilis is considered the cause in from 2 to 10 per cent. and next to syphilis, tuberculosis in about 10 per cent. of the cases. Still others are ascribed to various diseases in which abnormal nutritional changes are manifestly predominant.

In most cases the sight is so seriously impaired that the patient can barely count fingers, or, in others see the movements of the hand before the eye. As a rule both the eyes are not affected at the same time although the second eye is ultimately involved. it may be after an interval of several weeks, months or years. Of this the patient should be warned.

The treatment for this condition is, first local, which consists in the use of atropin to maintain mydriasis. After the local irritation has subsided, and when absorption is going on, the process may be hastened by one of the following means:—First, by the use of dionin in 5 or 10 per cent. solution, instilled 2 or 3 times a day, which acts by increasing the lymphatic activity; second, by the use of subconjunctival injections of from 5 to 10 minims of normal saline solution, repeating them after the resulting irritation has disappeared; third, by the use of mercurial oxide ointment applied or introduced into the cul-de-sac and followed by massage of the cornea through the closed lids. Salvarsan is also used by some in cases of syphilitic origin, with gratifying results.

DISCUSSION.—Dr. Zentmayer said that in the prognosis of interstitial keratitis we must not forget that disseminated choroiditis is very often associated with the corneal condition. In fact there is usually associated a uveitis. While suppuration is very rare in interstitial keratitis the cornea sometimes undergoes softening with a resulting staphyloma. I believe that in salvarsan we have made a distinct advance in the treatment of this condition. Improvement seldom follows the first injection but several are necessary. It always relieves the subjective symptoms and usually improves the objective symptoms. The disease in the second eye commonly runs a milder course than that in the first eye affected. I believe that more than 90 per cent. are due to syphilis.

Dr. Reber warned against the slowness with which results are achieved in interstitial keratitis. Twenty years ago it was pretty generally conceded that interstitial keratitis was almost invariably of syphilitic origin but since the advent of the modern laboratory methods we can make more accurate diagnoses. Many more cases of tubercular interstitial keratitis are reported. I have had two in my own practice within the last year. One must also bear in mind the type of interstitial keratitis that is lighted up by a traumatism. This generally occurs in people in whom the syphilitic taint is latent. Salvarsan and neosalvarsan are of less service in interstitial keratitis than in almost any other form of ocular inflammation. In interstitial keratitis repeated injections are necessary, sometimes 6, 8 or even 10 being required. It is a nice question whether inunctions won't produce quite as good results quite as promptly; no matter how prompt and vigorous the treatment, however, the second eye is almost invariably involved.

W. WALTER WATSON, M. D., *Secretary.*

1712 Walnut Street.

COLORADO OPHTHALMOLOGICAL SOCIETY.

MEETING OF FEBRUARY 21ST, 1914.

Dr. Melville Black presiding.

Retrobulbar Neuritis.

Dr. Hiram R. Stillwill presented the man who had been shown by Dr. Sedwick at the December meeting on account of loss of vision of the left eye. The vision of the right eye, which early in the history of the case had fallen to 20/200, had subsequently risen to 5/7. Then on January 23, in the course of a few hours, the vision of this eye had been entirely lost. The patient came in with the right disc swollen and hazy. Exploratory operation on the ethmoids and sphenoids of this side gave negative findings. There had been no improvement in vision. There was still some blurring of the fundus details, but the disc looked more or less atrophic.

Neuroretinitis.

Dr. Otis Orendorff presented a case of neuroretinitis with web-like vitreous opacities. The patient thought his trouble due to snow blindness, as he had been hunting in the mountains shortly before the disturbance began. There was no history of syphilis. Slight improvement of vision had occurred after repeated subconjunctival injections. Mixed treatment had been given.

DISCUSSION. Dr. Spencer would not attach much importance to the negative history, and would have a Wassermann test made.

Dr. Coover would even give salvarsan without waiting for a Wassermann test.

Dr. Orendorff later reports Wassermann negative, and is strongly disposed to regard the condition as due to snow-blindness.

Recurrent Kerato-Iritis. Macular Choroiditis.

Dr. F. R. Spencer presented a woman of sixty-six years, who for five years had suffered from repeated attacks of keratitis and iritis in the right eye. The right cornea was diffusely and irregularly opaque, and its surface uneven. There was a scanty deposit of lime. The irregular pupil was faintly visible. There was decided pericorneal injection. The left cornea showed a thin central interstitial opacity. In the region of the left macula, reaching to the disc downward, was a large area of choroiditis. A diagnosis of atypical sclerosing keratitis had been made.

DISCUSSION. Dr. Coover thought an iridectomy would tend to diminish the right corneal opacity.

Dr. Black thought any operative interference would be dangerous.

Traumatic Cataract.

Dr. J. G. Schall presented a man of thirty-three years, whose right eye had on January 25th been struck by a piece of coal slag. The only corneal evidence of the injury was a crescentic shallow scar 3 or 4mm. long opposite the upper edge of the pupil. The iris was not adherent to the cornea. The lens had become cataractous within forty-eight hours. Later the anterior capsule ruptured, and lens substance and a shred of the capsule were now floating in the anterior chamber. Had the eye been penetrated by the foreign body?

DISCUSSION. Dr. Matson thought the wound a penetrating one.

Dr. Jackson thought the lens capsule might have burst simply as result of rapid swelling of the lens.

Several members failed to understand how the cornea could be laid completely open without any trace remaining of contact of the iris and capsule with cornea.

Injury by Broken Spectacle Lens.

Dr. C. O. Eigler (by invitation) presented a man of fifty-seven years, whose left eye had been lacerated by a spectacle lens which had been broken by a piece of kindling. There was an L-shaped cut in the cornea, the lens was hazy and displaced into the anterior chamber, and tension was becoming elevated.

DISCUSSION. Dr. Jackson thought the eye might not quiet down until the lens was disposed of.

Dr. Black criticised the fact that eserin had been used, inasmuch as the rise of tension was due to swelling of the lens.

Suspected Hypophyseal Disease.

Dr. D. A. Strickler presented a woman of forty-nine years, whose history was suggestive of hypophyseal disease. In the past ten years she had had almost constant headache, and her weight had increased from 140 to 210 pounds. Her size of glove had increased from 6 to 7¾, and of shoe from 5 to 6-EE. The features had enlarged. Vision had fallen to R 20/40, L 20/40, with correction. The fields were greatly contracted above, below and on the temporal side. The patient stated that she saw double in the right eye. The temperature was slightly elevated today. An X-ray plate did not show the posterior clinoid processes. An internist had favored a diagnosis of acromegaly. There were no fundus changes.

DISCUSSION. Dr. Spencer thought tests regarding the labyrinth might give information as to intracranial involvement.

Dr. Magruder suggested that the sugar tolerance should be tested. There was usually increased tolerance in pituitary lesions.

Traumatic Cataract.

Dr. E. E. McKeown presented a man of twenty-eight years, who while cleaning a chicken house had been struck in the eye by a foreign body. The fact that a hammer was used made it possible that a piece of steel might have entered the eye. There had been hypopyon on the second day, and paracentesis had been followed by improvement. Development of cataract began two weeks after the injury. Needling had been done four months after the injury, and vision was improving slowly.

DISCUSSION. Dr. Libby would make a four millimeter opening in the lens as soon as vision ceased to improve.

Dr. Black advised skiagraphy to settle the question as to the presence of steel in the eye.

Dr. Jackson thought the history of early infection favored the presence of steel in the eye.

Brain Tumor.

Dr. A. C. Magruder reported that the woman with left homonymous hemianopsia shown at the January meeting had died shortly after the commencement of ether anesthesia for intracranial operation. At autopsy a large, almost spherical tumor (as mentioned in a note to the previous report) had been found displacing the right posterior occipital lobe of the brain. The brain and tumor were demonstrated. Microscopic examination had shown the tumor to be a spindle-cell sarcoma.

Syphilitic Iridocyclitis.

Dr. Melville Black presented a case of luetic iridocyclitis which had rapidly improved under doses of 0. 6, 0. 8, and 1. g. of neosalvarsan given at short intervals. Mercury was now being given by inunction.

Birth Injury? Sympathetic Irritation.

Dr. Black presented a patient age twenty-two years whose left eye had been injured at birth. The left lens was densely opaque, and the pupillary margin adherent except above. The right eye showed some injection and its accommodation was only 5. 5 D. Should the left eye be removed?

DISCUSSION. Dr. Matson thought it would be risky to leave the eye in.

Dr. Jackson thought the lower accommodation of the second eye was probably not sympathetic. Low accommodation may occur normally in some young persons.

Perforating Injury. Traumatic Pterygium.

Dr. Black presented a man of sixty-three years whose right eye had been injured by a gun explosion in 1868, and last August by perforation with a piece of wire. The eye was painful and inflamed, vision nil, and a fleshy pterygium-like growth extended far across the cornea. Should any operation other than enucleation be attempted?

DISCUSSION. Dr. Spencer thought it would be safest to enucleate.

Dr. Jackson would keep enucleation for the last resort.

Burn from Bichloride of Mercury.

Dr. Black presented a man whose eye had been burned by explosion of a bottle containing bichloride of mercury. The day after the injury almost the whole corneal surface had stained with fluorescein. The treatment had been atropin once daily, pure castor oil instilled every two hours, and frequent cleansing with boric solution. The membrane which had first formed over the cornea and conjunctiva had since disappeared. The eye was somewhat red, but there were no adhesions. (Dr. Black later reports complete recovery.)

Burns from Caustic Soda.

In Dr. Bane's absence, Dr. Black showed the patient presented by Dr. Bane at the December meeting on account of a burn from caustic soda. This eye, which had seemed for a while to be progressing favorably, had become very much worse, the lower fornix being entirely adherent, and the cornea very opaque and vascular.

Sarcoma of the Cornea.

Dr. Melville Black and Dr. W. H. Crisp demonstrated a microscopic section from a corneal growth removed by Dr. Black, which proved to be spindle cell sarcoma. The tumor, which had been developing for about three years, was of pearly gray color, covered almost the lower outer half of the cornea and extended slightly upon the conjunctiva, and had the clinical appearance of a papilloma. It had been excised, with thorough curettment of the underlying and surrounding tissues.

Retinal Detachment with Cystic Degeneration.

Dr. J. W. Lehan showed gross specimens of an eye which had been enuclated on account of supposed intra-ocular tumor. The patient, a boy of sixteen years, gave a vague history of injury, and came on account of failure of vision and severe pain. At examination the tension of his eye was 70 mm. of Hg. The fundus was nowhere normal, and nowhere distinctly seen. A large central area was made out, covered by numerous small vessels. There were several large white areas and a number of irregular masses of pigment. Tentative diagnosis of probable sarcoma had been made. The bisected eyeball showed general detachment of the retina, which lay about two-thirds of the way forward toward the lens, and was covered in front with a number of large cysts. Microscopic examination would be reported later.

Albuminuric Retinitis. Chloral Hydrate to Reduce Blood Pressure.

Dr. G. F. Libby made a supplemental report on the case of albuminuric retinitis presented in November. Under chloral hydrate, 4 gr. b. i. d., sweating, and catharsis, the blood pressure had been brought down from 220 to 165 mm. of Hg. The patient had lately omitted the choral hydrate for two weeks, and the pressure was up to 180 again, although diaphoresis had been kept up regularly. The retinal exudate was almost all absorbed, and the patient had kept at her work as teacher.

William H. Crisp, Secretary.

ROYAL SOCIETY OF MEDICINE, SECTION OF OPHTHALMOLOGY.

The adjourned meeting of the section was held on Monday, February 16th, for the purpose of concluding the discussion on the subject of the use of Salvarsan in ophthalmic practice. The chair was occupied by the President, Sir Anderson Critchett, Bart., C. V. O. F. R. C. S.

Mr. W. Lang showed a case which, in 1908, developed sympathetic ophthalmia following a gunshot wound. Much benefit had occured from giving salvarsan.

Mr. Parsons, discussing the case, thought it showed that sympathetic ophthalmitis was a general infection; and it would be difficult to believe that a purely local condition could persist for three years, the interval between the injury in this case and the subsidence of the sympathetic trouble.

Mr. Fisher also spoke of two cases in which Mr. Browning forecasted the onset of sympathetic trouble from the blood count.

The debate on the use of salvarsan was continued by Lieutenant-Colonel R. H. Elliot, I. M. S. He said he had had no experience with neo-salvarson. As he had had an experience of optic atrophy following the use of soamin, he asked the surgeon-general's assistance in getting reports of cases in which the same calamity followed the use of salvarsan; but none were reported, and he believed the reason was that they did not occur they were able men and fully on their guard. On the other hand, it was their experience that those cases which presented signs of optic neuritis, of presumably syphilitic origin, acted excellently to the remedy. As the whole of a dose of salvarsan seemed to be eliminated from the system in ten days, he thought any trouble which was likely to arise would be evident in a month or so, after which period no anxiety need be felt. In his large practice in Madras, the intramuscular method was abandoned in favor of the intravenous, largely on account of the pain caused by the former, which in many cases necessitated the use of morphia. A Wassermann was done in each case, and the administration was not continued after that test was negative. In no case did they abandon mercury and iodide, which were given in the intervals. The most startling benefits were obtained in recent or acute cases involving the uveal tract. One man was practically blind, with a congested eye; his vitreous was full of opacities, and a gummatous mass involved the ciliary body; yet within a week of using the remedy he could count fingers at 20 to 30 feet. His general nutrition also improved. With muscle palsies and optic neuritis the results were very satisfactory, though not with tabetic conditions. He knew of two deaths following the use of salvarsan, both in marasmic patients, who probably would not have lived long in any case. With regard to sympathetic ophthalmitis, Gifford, of Omaha, from the results obtained in it from atoxyl and salvarsan, argued that it was a general protozoal disease.

Mr. E. Erskin Henderson reported two cases of severe irido-cyclitis following cataract extraction on the 8th and 10th day, respectively. Ordinary treatment supplemented by staphylococcal vaccines proved of no value, but after two doses of neosalvarsan both cases recovered. In one case a man aged 54 he got after needling 6/6 and J.1. In the second case a woman of 72 iridotomy would probably be necessary.

Mr. Henderson said he was led to make a trial of the drug in these cases from the results obtained in sympathetic ophthalmia, as these two eyes were of a type to lead to the disease, and if useful in the sympathetic eye why not in the exciter.

Dr. Alexander Flemming said that when salvarsan was introduced into this country it was said to have ruined many eyes: but there seemed no real evidence that the drug had produced an evil effect on any eye; not any cases of optic nerve trouble had followed its use at St. Mary's Hospital He preferred salvarsan to neo-salvarsan, though the latter was very easy to use. He had never seen much benefit from salvarsan in interstitial keratitis. In one case, a chancre of the inner canthus disappeared in a few days under the treatment. In choroiditis the results were very rapid and complete. In one case an Argyll-Robertson pupil, in a case diagnosed by a physician as tabes, became a normal pupil under the treatment.

Major Harrison thought the timidity felt about using salvarsan was largely due to the evil repute of atoxyl and soamin. but there could be no doubt about the beneficial effects of salvarsan. He had seen a case in which omission to use salvarsan on account of its supposed neurotrophic effect on cerebral nerves, resulted in a calamity. He proceeded to discuss points in the technique, and expressed the opinion that as all the salvarsan given could not be collected in the urine, probably the drug was not entirely eliminated from the system as soon as was supposed. Still, by spacing-out the doses at intervals of not less than a fortnight, any cumulative effect need not be feared. If a case seemed to indicate more frequent doses, he thought there would be little danger. He had not had any catastrophies in his practice with salvarsan.

Mr. J. B. Lawford read notes of a severe case of post-operative plastic iritis treated by neo-salvarsan, the patient being a man aet. 60, the subject of acute gout. The operation was extraction and iridectomy. There followed hazy cornea, ciliary injection, exudation, and the formation of a hypopyon. A mixed staphylococcus vaccine produced no visible effect. Nineteen days after the extraction, .9 grammes of neo-salvarsan was injected intravenously, and in two days there was definite improvement: while four days later the hypopyon was very small, and the congestion was diminishing. He went home, but returned later, and the hypopyon had returned. A similar dose of neo-salvarsan was injected, and almost immediately the eye became brighter, and there was general marked improvement.

Mr. Browning, in answer to a number of questions admitted that the blood count by which one could forecast the onset of sympathetic trouble was not infallible, but it was true in the great proportion of cases.

Mr. C. Devereux Marshall,
112 Harvey Street, W.

101 Newbury Street, Boston, Mass., May 16, 1914.

Editor OPHTHALMIC RECORD:

In your May issue I note that Dr. Denig claims priority over Dr. Tiffany for the suggestion of trephining the sclera for separation of the retina, stating that he had suggested the operation in 1913. In the concluding paragraph of my paper on "A new instrument for producing a subconjunctival fistula" (The Ophthalmoscope, March, 1910.) I suggested this procedure, and in the following year or two employed it several times. Since then I have abandoned it as unsatisfactory, I found that while the immediate results were apparently satisfactory, they were no more so than those following scleral puncture, and that the re-attachment of the retina was in no case permanent. The opening quickly became closed, and it did not seem to me that any drainage took place other than that occurring at the time of operation, probably owing to the plugging of the opening by the retina. It also seemed to me probable on theoretical grounds that puckering of the retina incident to the healing of the wound would favor recurrence of the separation.

My present practice is to enter a Graefe knife through the sclera, twist it in the usual way to allow the sub-retinal fluid to escape, and at the same time to make steady pressure on the globe from the opposite side. After the fluid has ceased to flow the pressure is gradually relaxed. The Graefe knife is entered far enough so that when the retina comes down it is incised and a small amount of vitreous escapes through the scleral wound. The purpose of this is to retain the retina in position. The immediate results following this procedure have been as satisfactory as could be wished, but the ultimate results are still in question.

F. H. VERHOEFF.

NEWS AND NOTES.

Personals, and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. J. H. Buckley of Fort Smith, Ark., is in Europe for the summer.

Dr. Charles Enfield of Jefferson, Iowa, died recently of pneumonia at the age of 71 years.

Dr. C. P. Cook of Des Moines, Iowa, is spending the summer in Europe.

Dr. Lee W. Dean is president of the Iowa State Medical Society.

Dr. Walter H. Snyder of Toledo, Ohio, has started for the Mediterranean and will attend the Oxford Congress later in the summer.

Dr. E. J. Bernstein of Kalamazoo is president, and Dr. Wilfred Haughey of Battle Creek secretary-treasurer, of the Southwestern Michigan Medical Society, an organization of eye, ear, nose, and throat specialists.

According to recent newspaper reports, President Wilson's "History of the American People" and Mark Twain's "Huckleberry Finn" are being printed in braille type for the use of the blind. This is a very large undertaking, being an expensive process and a slow one even in the hands of the most expert workmen.

The report that glasses are furnished to the extent of less than 400 pairs per year to poor children by the city of Cleveland gives rise to the question why cities which provide many necessities to their poor do not include free glasses. Few contributions to human welfare are more productive of good.

American ophthalmology loses one of its most conspicuous figures in the death of Dr. Emil Gruening of New York. He was a civil war veteran, was once president of the American Ophthalmological Society, and for many years surgeon to the New York Eye and Ear Infirmary, and the author of important contributions on ophthalmic and aural subjects. Dr. Gruening died in New York City on May 30 at the age of 71 years.

Department chairmen of the Clinical Congress of Surgeons of North America at the London meeting in July are Mr. W. H. H. Jessup, surgery of the Eye; Mr. Arthur H. Cheatle, surgery of the Ear; and Sir St. Clair Thomson, surgery of the Nose and Throat. The program offers the following important topics to ophthalmologists:

"Intranasal surgery of the lachrymal apparatus," by J. M. West of Berlin, Germany.

"Sclero-corneal trephining operation or glaucoma," by R. H. Elliot of London, England.

"Operative procedure for strabismus," by F. Richardson Cross of Bristol, England.

"The operation for senile cataract," by John B. Story of Dublin, Ireland.

The following changes in ophthalmic staffs are reported from England:

Mr. R. Foster Moore has been appointed assistant surgeon to the Moorfields Hospital, London.

Mr. W. Peach Taylor has been appointed surgeon to the Bristol Eye Dispensary.

Dr. E. W. Alexander is pathologist to the Birmingham and Midland Eye Hospital.

Mr. R. A. Greeves has been appointed assistant surgeon to the Middlesex Hospital, London, succeeding Mr. Arnold Lawson who has become surgeon.

Dr. Ernest Thomson, sub-editor of the Ophthalmoscope, has resigned as surgeon to the Glasgow Eye Infirmary.

Mr. William Lang has been tendered a complimentary dinner at the expiration of thirty-three years service on the honorary staff of the Middlesex Hospital, London.

Foreign journals report the death of Dr. John Abercrombie, formerly secretary and later vice-president of the Ophthalmological Society of the United Kingdom; and of Dr. Max Berthold of Königsberg, Germany.

The curious case of the New Jersey boy who sees upside down has been paralleled by a freak of nature in a dachshund puppy owned in San Diego. The dog's sense of distance is reversed. When called he will back away from his master although obviously desirous of coming to him. A scientist became interested and discovered that the canine was suffering from astigmatic myopia. A special pair of spectacles was made for it. After becoming accustomed to the glasses the dog became normal though its unusual appearance causes much comment. (It would be interesting to know whether some scientist (?) has discovered a crab which moves only forward and whether lenses would cause said crab to resume his natural backward march.)

NEW BOOKS.

ATLAS OF THE EMBRYOLOGY OF THE HUMAN EYE, by Prof. Ludwig Bach, Marburg and Privatdozent R. Seefelder. Leipzig. Third Volume. 28 illustrations in the text. Plates XXXV-L. Published by Wilhelm Engelmann, Leipzig and Berlin 1914. Price—M22.

ANAPHYLAXIS IN OPHTHALMOLOGY. By Prof. Dr. Aurel v. Szily. First Assistant in the University Eye Clinic, Freiburg i. Br., and Dr. U. Arisawa. Osaka, Japan. 13 Plates. ten of which are colored and four text illustrations. Introduction by Prof. Dr. Theodor Axenfeld, Director of the University Eye Clinic, Freiburg. Published by Ferdinand Enke, Stuttgart. 1914.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
1 A.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *PaulGuilford(St.Luke's) *Casey Wood (St.Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm.E.Gamble(U. of I.) Wm H Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

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ORIGINAL ARTICLES

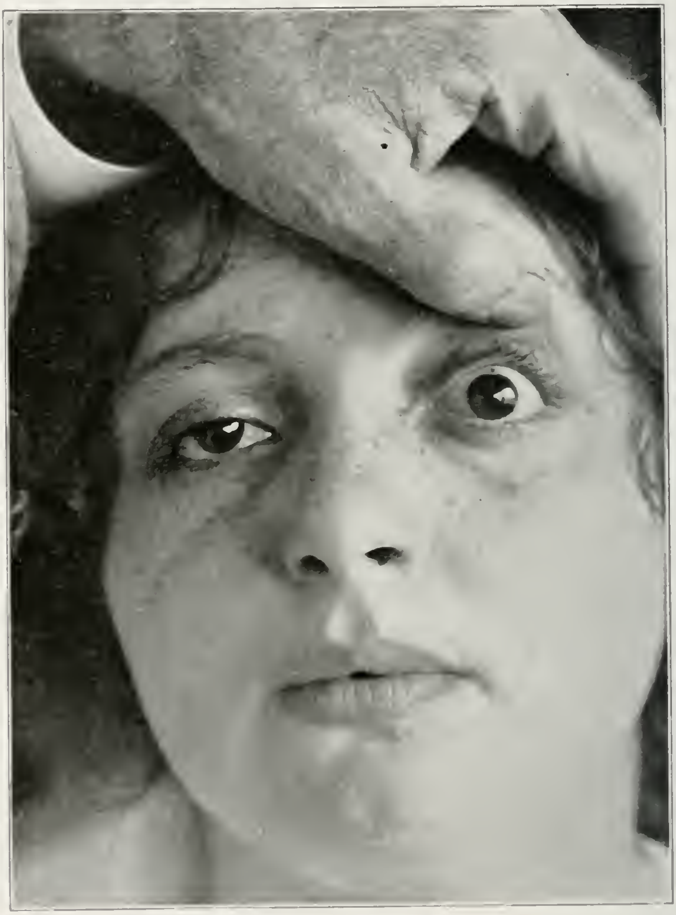
NEW OPERATION FOR CONICAL CORNEA

By Flavel B. Tiffany, A. M., M. D., Kansas City, Mo.

Kerato-conus or conical cornea is a non-inflammatory conical protrusion of the center of the cornea, due to thinning of the apex of this portion of the eye, and to an increased intraocular tension. The etiology is very obscure. The disease is not of frequent occurrence: when it does exist, it is usually in young women. It is rarely if ever congenital, but most frequently appears during the period of adolescence and usually progresses for several years before it comes to a standstill. There is evidently an arrest of nutrition or malnutrition of the apex of the cornea: it is claimed that in many cases there is some inherited specific disease.

The endothelial layer or Descemet's membrane is the part especially affected. In pronounced cases the disease may go on to an opacity of the apex, but it never terminates in ulceration or suppuration. In a well-advanced case, the conicity is apparent, even to the casual observer, especially when the patient is viewed from the side. Cases less pronounced may be overlooked by the superficial observer; but with an oblique illumination the oculist should not fail to detect the conicity and the deepened anterior chamber. The vision is usually greatly impaired. There is always a pseudo-myopia with irregular astigmatism. The principal diagnostic symptoms are an annular shadow and a blurred disc, visible with the ophthalmoscope.

The myopia and astigmatism can be corrected only in part by the use of concave glasses. In fact, as a rule glasses do little or no good. No medical treatment has been of any benefit. Nor has there been any surgical treatment that one would be warranted in recommending except in very pronounced cases. The treatment which has been recommended and practiced up to the present time is cauterization with the electro-cautery over the apex of the cornea. This of course leaves a scar or opacity of this portion of the eye. Then a large iridectomy must be made so as to establish a pupil at one side of the scar. With all these measures for flattening the conicity and arresting the disease, the results have been in no wise satisfactory.



Showing Trephine Opening and Iridectomy.

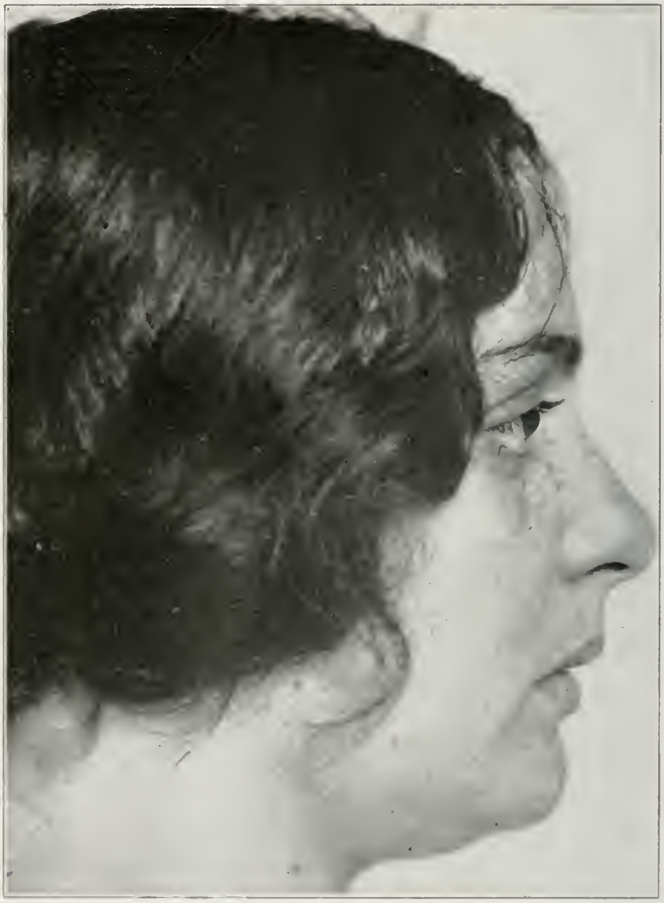
In my new operation I not only check the advance of the disease, but I reduce the intra-ocular tension and flatten the conicity without any scar, iridectomy or other disfigurement to the eye. My operation consists in trephining at the limbus, taking out a button of the cornea and sclera and then making a small peripheral iridotomy. If this does not suffice, I advise the removal of a small facet at the opposite point of the limbus; but in the second operation I stop with removing the button of the cornea and sclera and do not make an iridotomy. Should the case be pronounced, progressive and obstinate, I would not hesitate to advise making other facets at the limbus, all in line with the recti muscles. The iridotomy and removal of the facets are sure to arrest the disease and bring about the desired results in the way of reducing the tension and conicity and improving the vision. The several trephinings would insure the distribution of the cicatricial contractions, and there would be, I think, less likelihood of irregular astigmatism following.

Case.

Mrs. B. W., age 21, from Tulsa, Okla., came to my office May 23, 1914, upon the recommendation of her physician, Dr. J. H. Morgan. She said that Dr. Morgan had prescribed glasses for her two years ago, but that they did not help her and she had not worn them. For the last two years her vision has been failing and especially in the last two months. Her vision I found was 1/60 with either eye. I could not get a clear view of the fundus, but the annular shadow was pronounced and the disc distorted. The conicity of the cornea as represented in picture No. 1 was quite pronounced, and when I told her she had conical cornea, both she and her husband said that they had noticed this conicity for the last year or more. I explained the old operation of cauterization of the apex of the cornea and the probable results with the disfigurements. Then I suggested this new treatment, to which they readily consented.

On May 25, 1914, I trephined at the zenith of the limbus in either eye, taking out a small button which embraced a portion of both cornea and sclera. I then removed a small part of the iris, limiting the iridotomy to the roots of the iris. The portion of the iris removed from the right eye was so small that at first the opening was not visible; but within the space of an hour after instilling a myotic, the iridotomy showed distinctly below the shelf of the chamber. The piece of iris from the left eye was a little larger and the opening was distinct from the first. I placed in each eye a wafer of eserine salicylate, grain 1/600, and applied a bandage.

Upon removing the bandage the following day I was surprised to find that the conicity of the cornea as well as the tension had perceptibly diminished, and that the vision had improved. When the patient came from the hospital to my office, June 2nd, I tested her vision and found it to be 2/60 in the right eye and 6/60 in the left. About the tenth day after the operation she complained of pain and diminution of vision in her left eye. An examination revealed that the wound was patulous and the tension reduced; but the next day the opening closed and the vision came back to 6/60. For several weeks at intervals of five or six days this opening of the wound of the left eye recurred; the aqueous humor escaped, the vision went



Showing Conical Cornea.

down and there was considerable pain. Each time I used the wafer of eserine salicylate, and kept the eyes bandaged and the patient in a recumbent position. There was no relapse at any time of the right eye. I think that the reopening of the wound of the left eye was due to the fact that the conjunctiva retracted from over the wound, leaving it exposed. It finally healed up with most excellent results. On the eve of her returning home, July 11, 1914, the intra-ocular tension was normal and the vision permanently improved.

As I have already stated, had this operation failed in checking the conicity, I should not have hesitated to take out a facet at the opposite point below, and even one on either side: keeping them all in line with the recti muscles. But in these last operations I should have removed only a button of the sclera and cornea, without making an iridotomy. From my limited experience I feel that this operation promises more than any other for conical cornea. Besides it does not disfigure the eye, and there is little or no danger of any complications following it.

SYMPATHETIC OPTIC NEURITIS OR TRANSFERRED PAPILLO-RETINITIS, ASSOCIATED WITH ONLY A MILD SEROUS IRIDO-CYCLITIS. REPORT OF CASE.

BY HENRY BENJ. DECHERD, A. M., M. D., DALLAS, TEXAS.

The subject of Sympathetic Optic Neuritis is such a very interesting and uncertain one that I am constrained to record the following case, especially since it presents so many definite and certain facts, and an outcome rather more favorable than was at first anticipated. Most of all is it reported because the writer was fortunate enough to be able to observe the oncoming inflammation in the "sympathizing eye" from the hour of its inception to the final termination of the case.

Even today, ophthalmologists are by no means of one opinion either as to the classification or as to the etiology of these cases. As to the latter, I am strongly of the opinion (and I believe the history will bear it out) that in this case we were dealing with an infection, probably staphylococcic, which travelled from one eye to the other by way of the optic nerve apparatus. As to its classification, this case would most likely come under the head of transferred papillo-retinitis (migratory ophthalmitis being the general term) or sympathetic optic neuritis, since the nerve involvement seemed to be the main factor in both eyes, the mild accompanying double serous irido-cyclitis being of secondary import.

History:—J. S., male, colored, aged 32, laborer, was sent to me by his lawyer on June 10, 1912. The patient stated that on May 11th, 1912, he had been injured in the left eye by a piece of metal which had flown from a struck chisel. For several days he was under the care of a colored physician, who later sent him to an advertising doctor. A few days later, he applied for treatment to a specialist. This specialist informed me later that he had excised a piece of iris and had endeavored to replace the pillars through the original wound which he slightly enlarged for the purpose. Vision O. D. 20/20 O. S. 20/70 minus. On first examination, the patient told me that he was still having pain in the left eye, although the specialist had dismissed him one week ago as cured. I found in the left eye a linear wound of cornea, iris, lens, and sclera. This wound had evidently been quite deep, as the iris and ciliary body were still bound in the scar, together with the lens capsule and inflammatory exudate. The pupil was fairly dilated and oblong, the effect of previously used atropine not having disappeared. Immediate enucleation was advised, but being a superstitious negro, he absolutely declined such a measure.

I did not see the patient for one week, when he returned and said that he saw "clouds" in the right eye. This was thirty-nine days after the injury. O. D. 20/20 minus; O. S. 20/100. Left eye showed redness and definite but not marked irido-cyclitis. No pathological lesions noted in right eye. By the very next day, however, the edges of the right optic disc were becoming hazy and a few spots could be seen on Descemet's membrane. Vision was the same in both eyes, 20/100 minus. Patient complained of pain in O. S. at night and also aching in both temples mainly at night. On the following day, June 20th, both eyes showed a typical papilloretinitis, more deposits on Descemet's membrane, slight clouding of vitreous, a small amount of ciliary injection, with vision O. D. 20/200; O. S. 20/100 minus.

By the fourth day, the entire inflammation seemed to have reached its height; there appeared to be quite a deal of fluid in the posterior layers of the cornea, producing a crenated appearance. There was also by this time several well-marked splotches of black pigment in the same location; and these had the characteristic pyramidal arrangement in the lower half of the cornea. The vitreous in neither eye ever became sufficiently cloudy to obscure a perfect view of the fundus. Both the anterior and posterior changes in each eye were so similar that one description serves to apply to both of them. The only difference to which attention might be called was a little more irido-cyclitis and ciliary injection in the left eye due to the original injury. The swelling in both discs could be beautifully studied from day to day and from week to week.

In one week, the condition appeared to have come to a standstill; the retinal veins were large and tortuous, and the arteries seemed smaller than usual. Completely covering the optic disc and surrounding it for five or six millimetres externally, internally, above, and below almost to the ciliary body was a beautiful, white, moldy-looking exudate extending into the vitreous and intimately associated with the swelling and edema of the nerve-head and surrounding retina and choroid. On first looking at the lower half of both fundi, one would have made a diagnosis of detached retina, on account of the wavy, folded appearance; but as the vessels were underneath and hidden and not on top of the wavy field, the main condition was not one of detachment, although of course, there was some detachment due to the fluid beneath the retina. One specialist to whom I sent the case for examination did pronounce it a case of detached retina. (On account of the special interest of this case, I sent him to nearly every specialist in the city for examination).

Vision on June 21st, 1912; O. D. 6/200 minus; O. S. 20/200 minus. June 22; Left eye has become suddenly worse; vision 15/200. Anterior uveitis more marked in both eyes; but never any conjunctival chemosis. July 1st, 1912; V. O. D. 20/200; O. S. 10/200 minus. Both irides appear more swollen than at any previous time. July 9th, noticeable improvement everywhere; iritic pigment deposits being absorbed; no improvement in vision, however. Marked tinnitus has been present for two weeks or more, which the patient attributes to large doses of sodium salicylate. Discontinued salicylates. July 17th; O. D. 6/200; O. S. 2/200. August 3d; Subconjunctival injections of three or four minims of cyanide of mercury (1-5000), daily. Patient says that he began to notice improvement at once; and was very particular about calling for his injections. Really, I did not place much importance in them, employing them more as an experiment than for anything else. However, the vision had increased by August 12th to 20/50 minus in O. D. and to 20/70 minus in O. S. Sept. 20th; O. D. 20/40; O. S 20/50. Oct. 1st; O. D. 20/30; O. S. 20/50.

The treatment of this case included the remedies usually employed; laxatives, hot baths, atropine, hot fomentations, protiodide of mercury, potassium iodide, salicylates, dionin, calomel, dieting, outdoor sleeping, subconjunctival injections, etc. During the last few weeks of treatment, the patient did what nearly all Southern negroes do at that time of the year—picked cotton in the country. I think that had much to do with the betterment of his condition both mentally and physically. No history of syphilis was obtainable, although this disease is very common among the colored population of our southern cities. Mercury and potassium were employed, then, not for any syphilitic manifestation. Enucleation of the offending or exciting eye was advised on many occasions, but was invariably refused. It would have been in my opinion the very best treatment in this case; indeed, better than all of the other remedies combined and refusal to have it done might have been an important medico-legal point in the event that compromise out of court had not been consummated. If a patient refuses time and time again to take advantage of the best known treatment, does he not lay himself open to the charge of absolute negligence? Again, a repetition of the whole trouble may reappear at any time; and hence the patient is by no means in a safe condition, merely because the left eye is now quiet and vision in the other has returned almost to normal—certainly a rare occurrence.

A NEW ELECTRIC OPHTHALMOSCOPE.*

BY CHARLES H. MAY, M. D., NEW YORK.

The essential improvements in this new electric ophthalmoscope are simplicity, superior illumination of the fundus, and the replacement of the customary fragile mirror by a solid piece of glass which acts both as a condenser and as a reflector.

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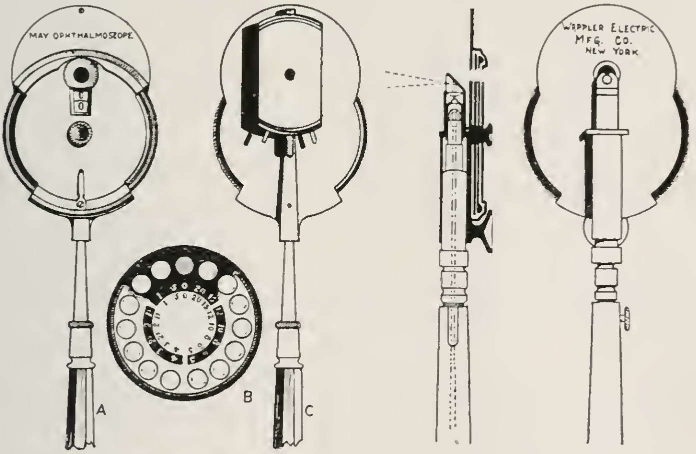
*Presented at the 1914 meeting of the Ophthalmological Section of the American Medical Association.

The mechanism of the instrument is illustrated by the accompanying figures: The metal filament lamp enclosed in the handle is a very small one (volts 2.75, amp. 0.1); this is sufficient because most of the rays are utilized whereas with the instruments hitherto in use only a small portion of the reflected light reaches the fundus. The divergent rays emanating from the lamp are made less divergent by a convex lens immediately above the lamp, and are then conducted into a solid rod of glass which acts as follows: The lower end of this refracting and reflecting device is convex and acts as a convex lens making the rays more nearly parallel; they then strike the upper, posterior portion of the glass rod which is here ground at an oblique angle to form a prism; this surface is silvered and acts as a plane mirror reflecting the rays so that they enter the eye of the patient.



May's New Electric Ophthalmoscope.

This condensing and reflecting device is attached to the anterior surface of the lens disc of an ophthalmoscope in such a manner that the upper extremity covers the lower half of the sight-hole; the upper half is left free and through this semi-circular aperture the eye of the observer receives the rays reflected from the illuminated portion of the background of the eye under examination. There is an arrangement by which the distance between the lamp and reflector can be increased or decreased, thus varying the degree of convergence of the rays and the size of the illuminated area of the background.

The area illuminated represents an evenly lighted surface without reflex, break, shadows, or defects such as are so often observed in electric ophthalmoscopes.

The writer has utilized his double-disc instrument (Annals of Ophthalmology, Jan. 1900) in which the lenses are interposed in the sight-hole by rotating the milled edge of an anterior disc for the convex lenses and a posterior disc for the concave lenses; this obviates the necessity of rotating a quadrant into place when fractions of diopters or when strong lenses are required. A second advantage of the writer's ophthalmoscope is that it is exceedingly thin: thus a minimum of distance separates the eye of the observer from that of the patient—a very important point. The apertures of plates and lens openings are so arranged that they are larger than the sight-hole, the edges of which are sharply bevelled—thus there can be only one edge capable of giving rise to a reflex; most ophthalmoscopes now manufactured are poorly constructed in this respect, and as soon as the blackening is worn off, as happens after a short period, there are annoying reflexes which are very trying and interfere both with the ease of examination and the clearness of the fundus picture.

The source of light is a small battery in the handle which measures 5 inches in length by a trifle over ¾ inch in thickness—a size much smaller than obtains in other instruments of this sort—made possible by the small lamp, the utilization of every part of the illumination, and economy through the automatic cutting-off of the current the moment the examination is ended. A rheostat, easily turned with one finger, regulates the intensity of the light and enables one to examine the vitreous with feeble illumination.

The instrument can be used as a transilluminator.

The battery handle can be detached and used as a storage battery connected with the ophthalmoscope by cords; or the cords can be attached to the outlet from the street current, protected by a suitable rheostat.

Finally, in case the battery gives out or the mirror burns out—and this happens at unexpected times with the best electric instruments—the disc-portion of the ophthalmoscope can be separated, readily attached to another handle with a tilting mirror, and thus converted into an ordinary reflecting opthalmoscope for use with any convenient source of illumination.

The ease and clearness with which the fundus can be seen by an inexperienced observer, whether in the direct or indirect method, is quite remarkable and is the greatest advantage claimed for this new instrument with its innovation in the method of illuminating the fundus.

The writer desires to express his obligations to B. M. Levoy, New York, in whose shop the optical experiments were worked out, and to The Wappler Electrical Manufacturing Co., of New York, who have placed upon the market a satisfactory instrument made after the writer's model.

698 Madison Ave., New York.

ABRAHAM LINCOLN.

The diagnosis of Heterophoria not only from a portrait but from the diplopia which occurred just after he was elected President of the United States in 1860.

BY E. E. HOLT, M. D., PORTLAND, ME.

I was very much interested in the article by S. Mitchell, M. D., of Hornell, N. Y., in the May OPHTHALMIC RECORD for 1914, as it recalls to mind my scrap book kept during the war of 1861-5, and an address delivered at the Auditorium, Portland, Maine, at the eleventh annual banquet of the Lincoln Club, February 12, 1901, in observance of the ninety-second anniversary of the birth of Abraham Lincoln. I said in part in this address:

An "illusion" which appeared to Abraham Lincoln has never been explained upon rational grounds, so far as my observations go.

J. S. C. Abbott, the historian, cites a quotation as coming from President Lincoln, in which the time of this "illusion" is given as occurring just after his nomination at Chicago, but J. G. Holland, the historian, quotes from an article which appeared in Harper's Magazine for July, 1865, written by John Hay, one of his private secretaries, and now Secretary of State, placing the time just after his first election. In answer to my letter stating these facts, the Secretary of State writes me that Noah Brooks of Castine, Maine, at one time a private secretary of President Lincoln, is the authority for this statement. Mr. Brooks[1] is out of the country so his statement, at the present time as to the time of its occurrence, cannot be given. According to the latter authority, President Lincoln is reported to have said:

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[1] Mr. Brooks wrote me after his return that the incident occurred right after Mr. Lincoln's election to the presidency in 1860.

"It was just after my election in 1860, when the news had been coming in thick and fast all day, and there had been a great 'hurrah boys!' so that I was well tired out and went home to rest, throwing myself upon a lounge in my chamber. Opposite to where I lay, was a bureau with a swinging glass upon it; and looking into that glass, I saw myself reflected nearly at full length; but my face, I noticed, had two separate and distinct images, the tip of the nose of one being about three inches from the tip of the other. I was a little bothered, perhaps startled, and got up and looked in the glass, but the illusion vanished. On lying down again, I saw it a second time, plainer, if possible, than before, and then I noticed that one of the faces was a little paler—say five shades—than the other. I got up and the thing melted away, and I went off, and, in the excitement of the hour forgot all about it,—nearly, but not quite, for the thing would once in a while come up, and give me a little pang as though something uncomfortable had happened. When I went home, I told my wife about it, and a few days after I tried the experiment again, when, sure enough, the thing came back again; but I never succeeded in bringing the ghost back after that, though I once tried very industriously to show it to my wife, who was worried about it somewhat. She thought it was 'a sign' that I was to be elected to a second term of office, and that the paleness of one of the faces was an omen that I should not see life through the last term."

Now this "illusion" like others that haunt people, as this did Abraham Lincoln, can be explained upon rational grounds when all the facts are known and rightly interpreted.

With the rapidly changing scenes in political events constantly presenting themselves for his consideration and action, after he was nominated and elected President, it seems cruel that he should have had the annoyance from this "illusion" added to his burdens, when it could have been explained upon rational grounds and set his mind at rest.

It was the beginning of the most momentous time in the history of this republic since its foundation, and Abraham Lincoln was the central figure to whom all loyal eyes were turned as a pilot to guide the Ship of State through the storm that was sure to come.

After participating in the joyful scenes that signalized his success in the campaign, Mr. Lincoln, said:

"There is a little woman who has some interest in this matter," and thither he wended his way to meet the companion of his life who was to participate in his future eventful career.

After breaking the news to her, he retired to his chamber to obtain some needed rest from the work and excitement connected with the campaign in which he had been elected President of the United States.

As he lay there upon the couch, every muscle became relaxed as never before. Little did he dream of the years of weary toil, care, and anxiety that was to be his lot and the tragic death that was to take him off in the zenith of his career, a career that has fixed upon him the eyes of the whole civilized world, and has given him a place in the affections of the American people, unsurpassed in the history of this republic. In this relaxed condition, in a pensive mood, and in an effort to recuperate the energies of a wearied mind, his eyes fell upon the mirror in which he could see himself at full length, reclining upon the couch. All the muscles that direct control, and keep the two eyes together were relaxed; the eyes were allowed to separate, and each eye saw a separate and distinct image by itself. The relaxation was so complete, for the time being, that the two eyes were not brought together, as is usual by the action of the converging muscles, hence the counterpart presentment of himself. He would have seen two images of everything else had he looked for them, but he was so startled by the ghostly appearance that he felt a "little pang as though something uncomfortable had happened," and obtained but little rest. What a solace to his wearied mind it would have been, if some one could have explained this "illusion" upon rational grounds.

We see by his own statement that it was destined to haunt him, for long after it had taken place, he says he "tried very industriously to show it" to Mrs. Lincoln, but without result. The failure of attempts to reproduce this "illusion" undoubtedly disturbed him still more, and added not a little to his troubled mind.

The reason why this "illusion" did not appear again, notwithstanding the constantly increasing cares and responsibilities thrust upon him, was because his nervous system had become accustomed to the strain put upon it, and he had recuperating powers enough to sustain the eyes in their normal relations to each other.

This incident of his life made an impression that never left me, especially, after he fell by the hand of the assassin, thus verifying the prediction put upon it by Mrs. Lincoln.

I never questioned, however, but that a rational explanation would be found for this "illusion," and when it came after waiting more than fifteen years, during which time I had come to consider constantly the conditions which give rise to such troubles, I felt what a great relief it would have been to President Lincoln, had the explanation been made to him at that time.

The factors, which enter into the solution of this problem of double vision, have to be considered in the elucidation of the causes that produce weak eyes, headaches and other various nervous disturbances. Muscular and mental fatigue often produce disturbances in the function of seeing, and visions are projected which are real to the person thus affected, and lead him to interpret them for good or evil.

Dr. Edward H. Clark, one of the renowned physicians of New England, during his last illness, while he was suffering constantly from a fatal disease, wrote a book on visions, dividing false visions, according to causes, into those due to disturbances of the brain, those due to disturbances of the eyes, and those due to disturbances of the rays of light before they enter the eyes. President Lincoln's "illusion" was due to a disturbance of the eyes, a complete relaxation of the muscles that keep the two eyes together and enable them, in the normal state, to see everything single.

This was a temporary condition due to the fatigue from the intense work and excitement which had been going on from the time of his nomination until after his election as President of the United States.

There are conditions, however, which are born with the eyes, that may be developed enough by over-using them to produce headaches, and other manifestations of disorders of the nervous system, which may be accompanied with double vision. By the advancements in modern ophthalmology, a large number of these cases can be relieved which were formerly considered to be incurable.

Mr. Lincoln was before and after his nomination for the Presidency, under a great physical and mental strain, which increased until his election in November, when it continued constantly to go on until his death in April, 1865. The wonder is, that he did not have repeated "illusions" due to derangements of the nervous system from performing the great amount of work thrust upon him, and from the cares and responsibilities in consequence of the "irrepressible conflict" which burst forth into one of the bloodiest wars that the world has ever witnessed.

It may be said, however, that every incident in one's life has some value when philosophically considered, and the evil omen assigned to this "illusion" by Mrs. Lincoln may have had its value in making the President more cautious of himself than he otherwise would have been had it not occurred, and of preventing his death earlier in his career before he had performed services to his country unsurpassed by any individual in the history of this republic.

It was certainly a singular coincident that Mrs. Lincoln should have attributed an evil omen to this "illusion," and should have predicted so nearly what actually came to pass, but in the light of a knowledge of the conditions which produced it in him, and which not infrequently produce similar occurrences in others, we must regard it as one out of thousands which transpired as predicted, and which therefore must be considered only as an incident in his unique life.

From the description given in the quotation, it is fair to assume that the diplopia described was due to the elevation of the left eye, as shown in the portrait reproduced in Dr. Mitchell's paper, as Mr. Lincoln says: "I saw myself reflected nearly at full length, but my face I noticed had two separate and distinct images, the tip of the nose of one being about three inches from the tip of the other." Had the diplopia been due to the lateral muscles one image would have been above the other and the description would have tallied with that condition.

Most of the portraits of President Lincoln conceal or shade one eye so that the hyperphoria is not noticeable. Photographers recognize the defects in the position of eyes of persons and select a position which obviates these defects as much as possible, as was done in the one which was reproduced in connection with my printed address.

A CASE OF RELAPSING ACUTE IRITIS APPARENTLY CURED BY THE USE OF AUTOGENOUS VACCINE.

BY H. C. PARKER, M. D., INDIANAPOLIS, IND.

On Oct. 15, 1913, Mr. C. G. B., age 34, consulted me in regard to an inflammation of his left eye. His previous ocular history was negative except that fifteen years previous he had had a similar attack which had been diagnosed as iritis. At this time there was a coincident attack of rheumatism of the acute articular type. This attack of iritis had been slow to respond to treatment and the patient suffered much pain in eye.

Personal history: Elicited the fact that patient had had an acute gonorrhoeal urethritis about sixteen years ago, which, while of rather prolonged duration apparently healed without untoward effects. Denies syphilis and I could see no reason to doubt patient's word as I knew he would be honest with me.

Present Condition, Physical: Well nourished, robust man of good color and appearance of excellent health. No general symptoms other than a chronic constipation. *Ocular Condition*: Has had no ocular trouble other than above mentioned. Has never worn glasses or felt the need of them. OD. normal in appearance—vision normal. OS. inflamed for past five days. Has used hot fomentations and atropine.

Examination. Wide pupil and quite regular—quite marked ciliary injection. Some few pigment spots in anterior capsule of lens as a result of the previous attack of iritis. No deposits on Descemet's membrane. Eye sensitive to palpation. Continued atropine and hot fomentations, also gave aspirin in 5 grain doses four or five times a day with plenty of water and an active cathartic.

Two days later, Oct. 17. The iris was more discolored. Pupil less dilated—a slight Descemetitis was noticed and the discomfort was more marked. I ordered an increase in number of atropine instillations.

Oct. 20. Iris clear, wide pupil, very little injection. No pain.

Oct. 24. Eye nearly white. Atropine reduced to once a day. Give twenty drops K. I. T. I. D.

Oct. 28. Slight relapse, ordered increased atropine and aspirin.

Oct. 31. Increase in deposits of Descemet's membrane—more injection. Sent patient to Turkish bath. *Nov.* 3. Marked increase in all signs and symptoms, ordered patient to stay in the house and gave protiodide of mercury grs. $\frac{1}{4}$ four times a day. *Nov.* 8. Condition still worse. Has an intolerance for mercury and K. I., so omitted both. *Nov.* 15. Eye again nearly white and no subjective symptoms. Vitreous very muddy. *Nov.* 22nd. VOS.=12/200. Eye practically white. I suggested an examination of teeth and gums for pyorrhoea. This was done by two competent dentists both of whom stated there was no pyorrhoea or decayed teeth. Teeth all alive by electric test. *Dec.* 19. Patient had been examined by a good general man who stated physical condition normal. Eye had been quiet for over three weeks until three days ago when it became pink and slightly painful—upon dilating pupil with 2% atropine there was found a large posterior synechia downward.

Dec. 29. Iris boggy—aqueous very muddy—vision=light perception only. A leech was used with good effect, dilating pupil and relieving pain. Had given mercury again on Dec. 19th but patient has no tolerance for it. *Jan.* 19th, 1914. Slight improvement. Used 5% dionin with other treatment. Eye less red—no pain. *Jan.* 29. Another relapse. Referred patient to a genito-urinary specialist, Dr. Haemer, who reports enlarged vesiculae seminalae which when milked show a far from normal seminal fluid. Cultures made from this to obtain an autogenous vaccine.

Feb. 6, 1914. Given 50,000,000 mixed culture vaccine with very little if any eye reaction. *Feb.* 10th. Gave 65,000,000 subcutaneously with a marked eye reaction on Feb. 11th, which had nearly subsided on the 16th so advised a third injection which was given, this time causing no eye reaction.

Feb. 20th. Eye white and patient is able to read comfortably (with right eye) for first time in four months. *Up to Feb.* 28th, patient received 6 injections of vaccine without any local reaction except that following the second injection. *Mar.* 25, 1914. Eye white and has been so over a month—vision still poor 1/10—. Pupil small and reacts well to light. No subjective symptoms. Patient discharged as well. *May* 15, 1914. Eye has remained white and quiet. Dr. Haemer reports that the vesicular condition has practically cleared up.

This case goes to show that if a diligent search is made the etiological factor in most of the cases of troublesome recurrent iritis can be determined. ———

Among 80 inmates of the Athens County Children's Home (Ohio) 23 cases of trachoma have been found. Investigation of the trachoma problem in Youngstown, Ohio, has resulted in improved conditions for workmen in factories in this city

REPORTS OF SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Congress.

The Annual Congress of the Ophthalmological Society was held at the rooms of the Royal Society of Medicine, Wimpole street, on Thursday, Friday and Saturday, April 23-25, while a clinical meeting was held at the Central London Ophthalmic Hospital, Judd street, W. C., on Friday afternoon.

The chair was occupied by Mr. F. Richardson Cross, of Clifton, Bristol, and among the distinguished visitors were Professor Uhthoff of Breslau, Professor Staub and Dr. Landolt of Paris.

The President, in the course of a short introductory address, reminded members of the distinguished work of his predecessors in the chair—Bowman, Hutchinson, Hulke, Hughlings Jackson, Argyll-Robertson, Berry, Sir Henry Swanzy, David Little, Priestley Smith, Nettleship, Tweedy and Lawford—and expressed congratulation on behalf of the Society to the Royal Society of Medicine on the success achieved by the Section of Ophthalmology. He referred to his investigations on the question of factory lighting, undertaken at the request of the Royal College of Surgeons, and thanked members for the help they had given him on the subject. Most of the replies, however, from members who practiced in industrial localities, showed that there were few ailments which could be attributed to the insufficient or bad lighting of factories; but the inquiry did not include such special work as glass-making or working on red hot or white hot conditions of metal, testing arc lamps, etc. Any injury done by excessive artificial lighting seemed to be attributable to the ultra-violet rays, as in the case of snow-blindness; but the wearing of any glasses largely protected the eyes from the ultra-violet rays. The negative results of this inquiry did not lessen the necessity for aiming at a perfect form of lighting, which was an economic question, concerning not only the best results of work, but the hygiene of vision. There still remained much to be learned as to the causation and treatment of eye diseases. All kinds of abnormal conditions of blood and system generally might set up inflammation of the intraocular blood vessels, such as iritis, uveitis, episcleritis, retinitis, etc. He referred to the suggestion of Mr. Basil Hughes that instead of rheumatic iritis the terms "metastatic iritis" should be used. It was very necessary to determine the etiological cause of the condition seen, for then measures could be taken to increase the patient's resistance to the particular organism, and of course any focus of disease must be energetically treated. He proceeded to speak of the selection shown by certain bacteria for particular localities, and said there was reason to believe that bacteria flourishing in their own particular locality might produce different strains showing a selection for other tissues. The view that there were evolutionary developments of bacteria seemed well justified. He also referred to the value of diphtheria antitoxin and the various hormones in ophthalmic work, as also the serum therapy, which was so well initiated by Sir Almroth Wright. He spoke of the gonococcus being the most widespread cause of infectious diseases, and pointed out that the organism might remain latent in the body for years. He referred to the work of Carl Browning showing the close relationship between syphilis and interstitial keratitis, and primary optic atrophy, general paralysis of the insane and locomotor ataxy, while half of the cases of iritis and one-fourth of the cases of choroiditis were shown to be syphilitic. The good effects of salvarsan and neo-salvarsan in eye disease, he said, were very marked.

Dealing with the history of the Ophthalmological Society, the President reminded the members that in 1880 a committee was appointed to consider defects of sight in relation to the public safety, with authority to communicate thereupon with the Government on the part of the Society if thought fit. In the following year an International Committee, fourteen nations being represented, was appointed "to deliberate concerning the tests of vision and color sense most applicable to persons employed in working or observing signals by land or sea when the lives of others are involved." In the second volume of the Society's transactions appear the resolutions arrived at, indicating how unsatisfactory the matter was at that time. If the advice tendered thirty years ago had been taken advantage of many disasters would have been prevented. The Society also took an important step in 1884 in connection with the prevention of blindness from ophthalmia neonatorum, and a special committee appointed brought forward certain resolutions, which were adopted. But the Local Government Board, Whitehall, declined to act on the suggestion that printed instructions as to the dangers should be handed to each person registering a birth, and, despite several attempts, it had not yet been possible to bring this about, notwithstanding the large number of cases of blindness due to this cause. But quite recently discretion was given to Town Councils and County Councils to make the disease notifiable if they thought fit, and now ophthalmia in infants had become notifiable. It was, said the President, terrible to reflect on the number of people whose sight might have been saved if adequate measures had been taken so long ago.

Mr. W. H. H. Jessop read a paper entitled "The Prognosis in Incipient Cortical Opacities of the Lens."

Sir Anderson Critchett, Bart., expressed his agreement with Mr. Jessop's remarks, and related the case of a clergyman, aet. 48, who, when he consulted a young oculist, was told he had cataract, and so nervous was he in consequence that he insisted on presenting himself for examination every few months, fearing that he would be losing his sight. But his sight continued good, except for a slowly progressing presbyopia, until he was 86.

Professor Landolt, Paris, agreed that cases such as those described by Mr. Jessop were often met with, and he thought the term cataract should be restricted to cases in which there was serious impairment of vision and finally required removal of the lens.

Mr. J. B. Story, Dublin, also expressed agreement, and suggested that the term cataract should not be used when, in the opinion of the observer, the condition was not progressive.

Mr. Leslie Paton described cases similar to those related by the author, and Dr. G. F. Alexander thought that the fine spicules often seen in the eyes of young people were congenital and had persisted throughout life.

Mr. Johnson Taylor, Norwich, also described such a case, in which he was able to prevent a fruitless operation for a condition which was not progressive nor detrimental to the sight.

Dr. George Mackay, Edinburgh, Mr. Rowan, Glasgow, and Mr. C. Wray, Croydon, also discussed the paper, and Mr. Jessop replied.

Mr. Bishop Harman, London, read a paper entitled "The Appearance of Pigment in the Iris of the Child." The observations were made on white children, the offspring of a blue-eyed, fair-haired father and a brown-eyed, dark-haired mother. At birth in each case the irides were of the usual dull, slatey-blue color: the iris tissues were obscured as though coated in some smooth, fine-textured material. Clearing of the iris stroma was noted from the third to the sixth week of life. The two children developed blue eyes, one blue with the suggestion of violet, due to rims of finer, darker stroma at the margins. The other blue became bright and cold in tint, owing to a marked thickening of the stroma in the intermediate zone. Two children developed brown irides. The first sign of brown pigment was noted at the sixth week. The pigment was in broad, irregular patches extending from the basal margin; it looked just as though the iris had been touched with brown ink which was soaking through to the surface and toward the pupillary border. The development was earliest in the temporal half of the iris. The patches extended and fused until the whole was brown. The tint became full and pure in one child, in the other there remained at the age of two years some suggestion of bluish or greenish tint at the depths of the crypts of the iris. In none of these cases was there any of the fine, scattered pigment that is so common a feature of the hazel and dirty-blue irides and which forms an irregular ring about the pupillary margin.

From a few observations it was thought that this surface pigment spread from the pupillary margin at a later date and from a secondary pigmentation.

Dr. Gordon Holmes and Mr. R. A. Greeves read a paper on "Flat Sarcoma of the Choroid, With Multiple Metastases." It was a case in which the trouble commenced with external rectus palsy, and later there was severe pain in the right forehead, and examination revealed considerable sensory loss in the distribution of the first division of the right trigeminal nerve. Still later there was complete loss of tactile sensibility and partial palsy of all external muscles innervated by the right oculo-motor nerve. The pupils, however, continued to react well to light, but he subsequently developed marked optic-neuritis. Death occurred at five and one-half years after the commencement of the symptoms.

Mr. Leslie Paton discussed the case.

Mr. R. A. Greeves read a paper on "Two Cases of Microphthalmia" and Mr. Leslie Paton one on "Papilloedema in

Disseminated Sclerosis.'' The author found in one hundred cases, five which showed evidence of past neuritis. In one case eighteen months after the optic neuritis had been present in one eye there were normal fundi without atrophy and with normal visual fields, vision being 6-9 in one eye and 6-6 in the other. He related a number of cases supporting his thesis.

Lt.-Col. R. H. Elliot read a communication on ''Dressings and Antiseptic Methods in Ocular Operations.'' The paper was concerned with attention to minute details to ensure scrupulous cleanliness in operations, and incidentally the author criticised some thoughtless procedures which he had seen in some clinics. Referring to the recommendation of Col. Herbert for irrigation of the conjunctiva with one in three thousand perchloride, he said that since 1907 he, Col. Elliot, had not had one case of post-operative pan-ophthalmitis.

Professor Landolt (Paris), in discussing the paper, expressed the opinion that boiling cutting instruments spoilt the cutting edge, an important matter seeing that a clean-cut wound was very much more satisfactory than one which was not made with a very sharp instrument. He therefore used and recommended dry heat, viz. up to 150 F., keeping the instrument in that for twenty minutes. He believed he had never had a case of infection from instruments. His practice was, when using atropine, to use a fresh ampulla each time. He objected to an irrigator.

Mr. W. H. Jessop referred to the danger of using long indiarubber tubes in connection with operations; several which were bacteriologically examined at a large hospital were found to be teeming with micro-organisms.

Professor Straub pointed out that most of the infections at operations arose from the spread of organisms which were already resident in the eye. His practice was to carry out the sterilising and cleansing procedure on the patient for three days before operating.

Mr. C. Wray read a paper on ''The Treating of Dislocated Lens.'' He said he did not consider needling was a form of treatment of dislocated lens. If the lens were very much displaced, iridectomy might be the right thing to do, but he did not think it was generally sufficiently displaced to justify that procedure. If the natural tendency of the lens was to become dislocated, he did not hesitate to do couching.

The paper was discussed by Prof. Landolt, Mr. J. B. Story, Mr. Priestley Smith, Lt.-Col. Elliot, Mr. Rowan, Prof. Straub, and Mr. Gray Clegg.

Friday morning was devoted to the subject of "Post-operative Complications of Cataract Extraction." The discussion was opened by Mr. Treacher Collins and he treated it chiefly from the pathological point of view. He first of all called attention to the difference noticed in the healing of extraction wounds after the different forms of incision made by different operators, and he described how some incisions healed much better than others. He greatly favored the incision which aimed at the cutting of a conjunctival flap. If the wound did not heal readily it was possible for a down growth of epithelium to take place and this might spread over the whole of the anterior chamber, and be the cause of blocking of the angle of the anterior chamber, and thus of causing a condition of glaucoma. He discussed the effect of delayed union of the posterior lip of the wound, and the cause of striated opacities of the cornea after extraction. Prolapse of the iris causing a bulging cystoid scar sometimes led to a late suppurative condition of the uveal tract which might occur months or even years after the healing of the wound. Astigmatism varied enormously in amount after extraction and largely depended on the healing of the wound and the way in which the flap was in apposition. Suppurative inflammation of the cornea was most often caused by the pneumococcus, but the frequency of this had been greatly diminished by aseptic precautions, as sterilization of instruments. Thus in a series of Moorfield's cases published in 1876 the percentage of eyes lost from this cause was 6.2. In another series published in 1894 it was 1.7, and in Mr. Collins' own cases done between 1900 and 1912 it was 1.15%. No sterilization of instruments was done at this hospital previous to 1883. He advocated the use of the galvano-cautery in such cases, and he had also seen good results follow the use of vaccines, but as other local treatment was always carried out it was difficult to say how much good really resulted from the injections. In some cases posterior synechiæ developed in quite quiet eyes, and these he did not look upon as being septic, in like manner "keratitis punctata," which was certainly non-septic, could often be found in cases running a normal course if these dots were really looked for. He thought it quite a fallacy to think that the mere presence of soft lens matter in the anterior chamber was capable of producing iritis, but when it was mixed with aqueous it certainly formed a very good nutrient medium for the growth of organisms if any were allowed to be present. With regard to the development of sympathetic ophthalmitis he had seen several cases which had greatly benefited by the use of salvarsan, and he also alluded to the information to be derived in dangerous cases by having a blood count done. He discussed in detail the way in which glaucoma was produced after an extraction or a needling of capsule, and the ways of treating them. He finally dealt with expulsive hæmorrhage, detachment of the choroid, opaque membranes, vitreous opacities, and detachment of the retina.

Lt.-Col. H. Herbert dealt with the subject from the clinical side. He said that the most serious after complication of cataract extraction was that due to infection. He strongly advocated the very thorough irrigation of the conjunctiva with perchloride of mercury, and gave statistics showing how that in India suppuration became all but unknown after this was carried out in a thorough and systematic manner. The usual strength was one in three thousand. This certainly had the drawback that it did irritate the conjunctiva and subsequently led to a further development of micro-organisms than would otherwise have been the case, but by this time the wound had healed, but it should be taken into consideration if it were contemplated to do a further operation within the first two weeks, such as a very early needling. He was strongly in favor of making a large conjunctival flap with the original incision for the extraction.

Sir Anderson Critchett, Bart, considered that Mr. Treacher Collins had placed upon a firm pathological ground questions upon which the profession was previously in a condition of uncertainty. He described what he considered to be the best procedure in complicated cases of cataract where the pupil had been drawn up into the wound, or where there was a dense capsular membrane. No class of case required greater experience, and he discouraged the slightest empiricism, advocating eclecticism, adopting the procedure found suitable to each particular case.

Mr. Carl Browning read an interesting communication on the subject, in which he said that out of hundreds of cases examined at Moorfield's Hospital before the cataract operation, only one case was pronounced bacteriologically clean, which subsequently became infected after operation. Three of the fourteen unsatisfactory cases during the last four years had been in eyes which had been reported unfit for operation, but were nevertheless operated upon. All these eyes were lost. Some of the chronic cases of low virulence responded to vaccine treatment; some yielded to salvarsan or neosalvarsan. (He suggested that causes for sepsis should be searched for further afield than in the eye itself, viz., in the gums, nose, throat, etc. Many of the infections he had found to be endogenous, not arising in the conjunctival or lacrymal sac. The practice of bandaging the eye for 24 hours previous to operation and deciding whether the eye was fit for operation by the comparative absence of pus on the bandage he considered to be bad from a bacteriological point of view, for in several cases examined carefully the organisms present had increased during the time the bandage was in position, and some forms of virulent organisms were present after the bandaging, which had not been detected before.

Mr. C. Killick described his results in one hundred and one serial cases, one of which suppurated. During three years in his own practice he had had only three cases of suppuration after cataract extraction out of one thousand cases. One eye in each of these three cases was restored to sight. He also described the varieties of after-cataract, and said he had had to needle twenty-eight times in all his cases, for capsular proliferation.

Mr. C. Worth spoke of hæmorrhage occurring into the anterior chamber five days after the operation, and he regarded that as peculiar to the operation with the conjunctival flap; he had not seen it where the incision had been corneal, and it probably occurred after some movement on the part of the patient, not necessarily a blow. This hæmorrhage retarded convalescence. He had adopted a conjunctival flap in all cases and keeping the patient quietly in bed for a longer time than for the corneal incision. He also spoke of the accident of vitreous coming forward into the anterior chamber through the discission of the membrane. At the time of the extraction he always divided the capsule straight across; he made no attempt at the V-shaped opening, so that in most of the cases there was an anterior capsule left in the line of the pupil.

Mr. A. W. Ormond read notes of two cases in which post-operative complications occurred after removal of lens. Both were endogenous infections.

Mr. J. B. Story (Dublin) said he had been able to assist some cases of wound infection by the application of the electro-cautery to the edges of the wound and by a sub-conjunctival injection of cyanide of mercury. He believed in the majority of cases of inflammation after cataract extraction it was an exogenous infection, and it had long been his practice before operation to make careful examination not only of the eye, but also of the nose and mouth. If there were many organisms, operation was deferred, and the patient submitted to a cleansing and fortifying treatment.

Mr. G. F. Alexander spoke of the great instruction he had received from operating in Lt.-Col. Elliot's clinique at Madras, and related some of the impressions he had derived from the wealth of material available therein.

Lt.-Col. Elliot spoke in high praise of Mr. Collins' contribution to this subject, and declared that there was no ophthalmologist for whose work the younger workers in India had a more profound admiration than that of this authority. He also thanked him for the generous terms in which he had acknowledged Col. Herbert's valuable work in the same direction. He, the speaker, had himself worked hard for a number of years on the subject of post-operative astigmatism, and Mr. Collins' present paper had been most valuable to him. He supported Mr. Collins' remarks about the influence of traumatism on the appearance of post-operative opacities. Where there was a large lens which had to be delivered through a tight wound there was apt to be striated keratitis. For non-inflammatory cataract he used two needles. For inflammatory cataract he used the knife, and if that failed he opened the chamber. He did not cut the capsule, but cut the healthy iris.

Professor Landolt expressed his great satisfaction with the contributions of the openers, and said his experience had led him to the same conclusions. One of the most dreaded complications, apart from sepsis, was prolapse of the iris. To avoid this he always performed iridectomy with the cataract extraction, excising the iris widely, often in two cuts, so that after the section it retracted by its own elasticity. If part of the iris were entangled in the scar he would cauterize it with the galvano-cautery, afterwards covering with a flap of conjunctiva. He had always been sceptical as to the use of the preliminary bandaging. And he proceeded on the assumption that no conjunctival sac was free from pathogenic germs. Moreover danger of infection persisted so long as the wound remained open. He pictured it as a race between the development of noxious germs and the closure of the wound. If the eye were tied up twenty-four hours before operation the development of these germs was favored and the patient's recovery handicapped. He did not agree with the use of strong antiseptics for cleansing afterwards, though in conjunctivitis he would even use nitrate of silver. He showed his forceps for the purpose of dealing with secondary cataract.

Mr. G. Mackay (Edinburgh) asked whether some weaker preparation than one in three thousand perchloride would not do. He had given up strong solutions because of the frequency of posterior corneal opacities. His preparation of the patient consisted of regular douching of the conjunctiva with sterile saline or boric lotion. In this connection argyrol was also useful, employed two or three times a day.

Professor Uhthoff (Breslau) also described his methods and experiences in the operation, and was followed by Mr. Thomson Henderson.

Professor Straub spoke of the chronic inflammation which commenced in the second week after operation, and said he had not seen this occur when the toilet after the operation had been well and carefully done. He also detailed his method for preventing squeezing of the eye, this squeezing sometimes accounting for the loss of the eye.

The President said all realized that the essential necessity was the production of absolute local asepsis, or antisepsis, the most rigorous cleanliness of instruments, patient and person. Most of the cases of sepsis he regarded as exogenous, but there were cases of endogenous infection. Cases such as Mr. Ormond related he considered to be gouty, using that term in its generic sense. He referred to the possibility of sepsis from the teeth, and from metastatic inflammation. He related some cases. The openers of the discussion briefly replied.

On Friday afternoon a clinical meeting was held at the Central London Ophthalmic Hospital, when the following cases were demonstrated and discussed:

Mr. F. A. Juler: (1) Hyaline bodies on the optic disc. (2) Congenital Ophthalmoplegia.

Mr. Leslie Payton: Congenital malformation of the disc.

Mr. M. S. Mayou: (1) Tuberculous mass in the optic nerve sheath. (2) Inflammatory or congenital mass around the nerve head.

Mr. Cecil Graham and Mr. Leslie Paton: Cases of West's operation for lacrymal obstruction.

Mr. Treacher Collins: Concussion injury with rupture extending across the optic disc.

Mr. C. Wray: (1) Colored drawing of the "rare cases of corneal disease," shown at the last meeting. (2) Two cases of ectopia lentis. (3) Case of intra-orbital neoplasm. (4) Lenticonus. (5) Case of 6D of hypermetropic astigmatism cured by the cautery. Vision 6-6.

Mr. Sydney Stephenson: Case of sympathetic ophthalmitis treated by six injections of neosalvarsan.

Mr. R. R. James: (1) Massive tubercle of the iris. (2) Crater-like hole at the disc, with macular changes.

Mr. G. Coats: Congenital partial paralysis of the oculomotor nerve, with cyclical contraction and dilatation of the pupil.

Mr. G. Coats showed and described a case of congenital partial paralysis of the oculo-motor nerve, with cyclical contraction and dilatation of the pupil. The condition was observed in the left eye of a girl aged ten, and had been present since birth. The signs of oculo-motor paralysis were: partial ptosis, divergence, abolition of upward, and limitation of inward and downward movement. The cycle of pupillary phenomena consisted of relatively rapid contraction, followed by a more gradual dilatation. The movements were not strictly rhythmical, and movement of the eye to the right, whether on convergence or conjugately, tended to induce contraction and render the phase of dilatation more intermittent and less complete; relaxation of the internal rectus had the opposite effect; but the play of the pupil continued even when the adducted or abducted position was continuously maintained. During contraction the pupil was immobile; during dilatation it responded to light and consensually. In ordinary circumstances the stage of myosis was accompanied by a contraction of the ciliary muscle and by slight raising of the lid. The eye was astigmatic and amblyopic, the other being slightly hypermetropic. Some nineteen cases of this affection had been recorded, most of them in recent years. Characteristic of the group was a partial third nerve paralysis, usually, but not always congenital, and interrupted by periods of activity in the internal rectus, levator palpebræ, sphincter pupillæ and ciliary muscle. The suggested explanation of Salus was stated and discussed—that during the repair of a lesion of the third nerve some of the axis cylinders, sprouting from the central end, made a kind of "false junction," and so connected a given nerve center with a muscle or group of muscles not belonging to it. If, for instance, all the fibres which should go to the internal rectus were diverted to the sphincter, then an effort at adduction would result only in a contraction of the pupil, and a partial side tracking of these fibres would produce partial phenomena of the same nature. This hypothesis, however, did not readily explain why the false junction should invariably take place between the internal rectus fibres (occasionally *also* the inferior and superior and inferior rectus fibres) and the pupillary and levator fibres—why, for instance, the attempt to look inwards was never associated with a movement upwards of the globe; something a little more haphazard might be expected in the case of nerve fibres finding their way at random through a mass of inflammatory material.

On Saturday morning Mr. Thomson Henderson demonstrated and described a pressure gauge which he had devised for measuring changes in the intra-pressure, instead of the digital pressure in order to test the intraocular tension.

Mr. C. B. Goulden read an instructive paper on optic neuritis and spinal myelitis, describing a number of cases which illustrated the usual progress of the disease. The paper was discussed by Mr. J. B. Lawford, who described a case in 1884, and he remarked that the profession remained as ill informed as to the causation of the disease as thirty years ago. He hoped a similarly careful investigation of future cases would be made as that by Mr. Goulden.

Dr. Gordon Holmes related three cases of this condition, one of whom recovered completely. In the cases which he had examined post-mortem the most extensive lesion was in the chiasma or in the optic nerve. There was considerable disintegration of nervous substance. Axis cylinders remained practically intact. The actual infecting agent was not yet known.

Mr. Brooksbank James read a paper on Irido-sclerotomy in Glaucoma. Having referred to previous communications on the subject he described the operation he adopted. A large conjunctival flap was turned down well over the corneal margin consisting only of the superficial part of that structure. An incision was then made transversely close up to the reflected conjunctiva being about 1 mm. within the limbus. A second incision was commenced at one extremity of the first and diverging somewhat finished close to the other extremity and including about $\frac{1}{2}$ or $\frac{3}{4}$ mm. of scleral tissue at this extremity of the incision. The anterior chamber was then opened by deepening the central portion of the first incision. After the aqueous had slowly escaped the incision was enlarged to its extremities. A repositor being used to free the flap from any deep attachments, it, the flap, separated through the length of the wound and turned outwards. A medium sized iridectomy was then performed and the conjunctival flap was replaced. He claimed for the operation that the conjunctival flap was a great safeguard and was necessary to allow of filtration. The opening in the sclera was a chink instead of a hole and facilitated the escape of fluid all along the wound. The iridectomy was always satisfactory and he had never known impaction of the iris tissue. The safety of the operation was due to the position of the incision and to the fact that the aqueous escaped very slowly. Having compared the results of his operation with trephining he far preferred the operation he had described for the permanent relief of tension. He showed some of his cases illustrating the method.

Dr. C. O. Hawthorne showed a number of perimeter charts taken from cases in which homonymous hemianopia was the principal or only evidence of intracranial disease. In his first group he placed cases of cardio-vascular degeneration with or without renal disease, the hemianopia here being due presumably to arterial obstruction or rupture. In a second group were described cases of homonymous hemianopia occurring in young women free from all evidences of cardio-vascular or renal disease, but the subjects of anaemia or chlorosis; and in these cases it was argued that the hemianopia was probably due to venous or sinus thrombosis within the skull. Rarely a similar condition develops in epilepsy, and here also it may be possible to hold that sustained arterial spasm may lead to capillary and venous thrombosis, which, occurring in the visual tract posterior to the optic commissure, would be sufficient to account for the homonymous hemianopia.

The paper was discussed by Mr. Brooksbank James, Mr. Leighton Davies, Dr. G. F. Alexander, Professor Landolt, Professor Uhthoff, and the President, and Dr. Hawthorne replied.

Mr. M. S. Mayou read a communication entitled "Diseases of the Eye in Animals," and it was illustrated by a number of photographs.

Mr. J. Gray Clegg read a paper on "A Case of Senile Cataract With Two Nuclei." In 1904, Mr. Gray Clegg saw a male patient aet. about seventy, who was suffering from a senile cataract. The ordinary method of extraction with iridectomy was adopted. After rupturing the lens capsule with a cystitome, he expressed the lens, when a dark brown nucleus escaped, but on further stroking movements to clear away the cortex, a second nucleus presented itself, and was removed. The operation was completed and nothing further worthy of note occurred. On examination, one nucleus, which he took to be the anterior one, was exactly of plano-convex shape, but the other was in the form of a positive meniscus with a small elevation at the center of the concave surface. Each nucleus measured 5 mm. in diameter, and was hard, and dark brown in color. The formation of the two nuclei had probably begun at an early age—probably before twenty-five, that being the time at which a nucleus was recognizable, but, of course, sclerosis of the inner central portion of the lens began much earlier.

Mr. Gray Clegg also read a commentary on "A Case of Death Following Open Evisceration." The patient, T. F., male, when aged forty-seven, was struck on February 27, 1906, by a chipping of hot metal on the right eye. A few days later, he was admitted to the hospital suffering from an extensive ulcus-serpens with hypopyon. Useful sight was destroyed, but the eye became quiet with the formation of a dense leucoma, involving the whole of the front of the eye. Some years after, cn October 2, 1913, he again attended at the hospital under his. Mr. Clegg's care, with signs of early panophthalmitis, and four days later, i. e., on October 6th, open evisceration was performed at his direction. On October 8th, the patient became rambling in his speech, and very restless. The temperature was 99 F. pulse regular, but the breathing was rapid; there were no physical signs of pneumonia. It was considered advisable to remove him to a general hospital, where acute post-operative mania was diagnosed. He died the following day at 1:30 p. m. A post-mortem examination was made. There were no external signs of disease or injury except the eviscerated globe, which was half full of thick, gummy pus. There was no evidence of inflammation in the conjunctiva, cellular tissue of orbit or lids. The surface of both cerebral hemispheres was intensely injected, and covered with a thin layer of greenish yellow pus; these changes being marked on the frontal lobes. The optic nerve of the operated right side was considerably swollen, and showed many minute vessels on the surface. On cutting it across at the optic foramen a bead of pus exuded at once from the cut surface of the distal portion. There was no evidence that the pus had reached the brain through the sphenoidal tissue. The left optic nerve was normal. The whole of the base of the brain was bathed in thick pus. Nothing abnormal was found inside the brain. There was no evidence of any ear disease, and the result of the examination was to show clearly that the infection had reached the meninges via the right optic nerve. In other respects the organs were those of a well-nourished, healthy male. He had had since November, 1909, thirty-three cases of complete purulent panophthalmitis due to all causes; open evisceration has been adopted in all of them, and in twenty-seven, a small hard stump has resulted, but in six the recovery was complicated by sloughing of the sclera, which was noted at intervals varying from ten days to three weeks from the time of the operation. The operation for open evisceration for panophthalmitis had always been considered to be free from the risks incurred on enucleation.

Mr. Maddox described the use of a traction thread passed through the insertion of the superior rectus muscle to facilitate the toilet of the iris in intracapsular extraction of the lens, and showed specimens of Col. Smith's instruments, which he had had made of the light metals, magnalium and aluminum. He also showed an improved form of his simpler pattern of axis finder for cylindrical lenses.

Mr. G. Coats reported a case in which, after a blow, the pigment epithelium and dilatator had disappeared from a sector-shaped area about 6 mm. broad in the temporal half of the iris. On external examination the iris stroma in this area appeared to be almost normal, but on illumination with the ophthalmoscope light was transmitted through the interstices. With the trans-illuminator the translucency of the sector was almost complete, the appearance of a coloboma covered with a very delicate veil being simulated. Elsewhere the iris transmitted no light. Under a mydriatic the inner, upper and lower parts of the iris retracted perfectly, but the outer remained quite flaccid.

the edge of the pupil forming a straight vertical line, and remaining in its former position. The pigmented margin was absent in the outer half of the pupil; present elsewhere. The color of the irides was a moderately deep, greenish blue. Vision 6-12 and J.1. No changes in the deeper parts of the eye. The condition was of great rarity, but had been described by Gelpke, Pohlenz and Boerma, and was attributed either to driving back of the iris to such an extent as to produce an indirect rupture of its posterior, less elastic layers; to direct injury by a penetrating instrument thrust up between the iris and lens; or to rupture from behind, by levering or tilting forward of the lens against the posterior surface of the iris. The first of these seemed to be the most probable, the rupture resulting either from simple stretching, or from nipping of the iris between the cornea and lens. It had recently been asserted by Rubel that the imperviousness of the iris to light was chiefly a function of the iris stroma, the pigment epithelium being relatively of little importance. This case on the contrary showed that when the pigment epithelium was absent in a lightly pigmented iris, the stroma presented scarcely any obstacle to the passage of the brilliant light of the trans-illuminator. The observation confirmed a statement by Fuchs that the depth of pigmentation in the epithelium was very variable, and that its amount was a most important factor in determining the translucency or otherwise of the iris.

ST. LOUIS MEDICAL SOCIETY, OPHTHALMIC SECTION, JAN. 7, 1914.

Persistence of Embryonal Eye Structures.

Dr. F. C. Woodruff: This patient, a little girl four years old, was presented at the clinic of the St. Louis Eye, Ear, Nose and Throat Infirmary, December 3, 1913, for a spot in the right eye, which the mother said had been present since birth, with no apparent variation from its present appearance. The case was seen in connection with Dr. H. S. Hughes, who has kindly written the following report:

The child seems of normal physical development, but very backward mentally; has had none of the usual diseases of childhood except measles one year ago, but for the first two years of her life was very frail. She is a second child, was born at full term, with a simple delivery, no instruments, following an uneventful pregnancy. The second day after birth the right eye became very much inflamed, lids closed and very much swollen with some discharge at their margins. The family physician ordered silver nitrate solution and warm compresses. After about ten days the symptoms subsided and when the eye could be opened the mother noticed a white reflex in the pupillary area, much as you see it now. The eye has been quiet since.

The right eye shows slight internal strabismus, shallow anterior chamber with small anterior synechia at seven o'clock with some minute pigmented specks upon the anterior capsule of the lens. Vision equals preception of light and probably large moving objects. Refraction about plus 1.50 in all meridians.

Looking into the pupil a white reflex is noticed at the temporal side shading off from a dense yellowish white at the periphery to a thinner steel grey in the middle of the vitreous chamber about the color of a pearl button. The base of this is close up against the ciliary body at the other margin of the lens and extends backward and upward and conforms to the convexity of the posterior surface of the lens.

Extending from it to the posterior surface of the iris are a few dense shreds. A larger one extends out across the vitreous. The left eye seems normal.

DISCUSSION. Dr. Jennings: The case presented by Dr. Woodruff is of great interest. In my opinion it is one of those rare cases of retarded development. The string-like membrane in the vitreous is the canal of Cloquet, and the white opaque patch at the back of the lens is the membrane that should have disappeared at birth, and when covering the whole posterior surface of the lens is called a pseudo-glioma.

Presentation of Cases Operated on by Col. Elliot, Nov. 4, 1913.

Dr. Clarence Loeb: The first case, Mrs. L. F., showed a beautiful result as far as the operation was concerned. There was good filtration, but the eye was no softer and the vision was practically no better than the other eye, which had been treated with eserin and pilocarpin. The second case, Mr. W. R., had had an acute conjunctivitis following the operation, but this subsided promptly under treatment without infecting the interior of the eye. There was good filtration and the tension was normal. The pupil was elongated, owing to the fact that a portion of the sphincter had been excised at the time of the operation. The vision had been increased from nearly 6-15 to nearly 6-8 with the proper correcting glasses. The other eye treated with eserin and pilocarpin had retained its vision of 6-6 nearly. The third patient, Mrs. S., had run a very unfavorable course. Immediately after the operation, there was a low grade iritis, which persisted in spite of treatment. After about two weeks' treatment, patient stated that ever since the operation she had seen halos around lights in both eyes. The treatment was changed to eserin and pilocarpin and the halos promptly disappeared, while the other symptoms in the operated eye gradually improved. At the present time the eye is still somewhat red, no halos seen, vision 1-12 (before operation nearly 6-15). The other eye had a vision of 6-15 nearly, as opposed to 6-8 before the operation.

From these three cases, I do not see any particular benefit that the operation offered over the use of miotics. I recall another case where, after an ordinary iridectomy in an eye whose vision and visual fields were diminishing, there was a sudden fall of vision (excentric to 6-30) and almost total loss of the visual field. The other eye, however, had retained a vision of 6-6 and good visual fields under eserin and pilocarpin. I believe that the operative measure proposed by Col. Elliot is a good one, where the patients cannot be kept under observation, but I would always use miotics when I could see the patient regularly and at once if any untoward symptoms arose. I believe that further advance in the treatment must be not along operative lines, but along lines leading to a determination of the cause of the disease and its elimination and prevention.

Dr. Cross: How about the tension in these three cases?

Dr. Loeb, in closing: The tension in all of these cases was not measured, but in all three was slightly increased before the operation. Since the operation, in my opinion, it is about the same, slightly lower, perhaps, but no better than in the unoperated eye, in which I have used eserin and pilocarpin.

Steel Partly in and Partly Out of the Eyeball.

Dr. J. Ellis Jennings: W. W., age 24, was struck in the left eye by a piece of steel, November 14, 1913, and came to the Frisco Hospital. The foreign body entered the eye in the ciliary region to the temporal side. With the ophthalmoscope the metal could be seen far back in the vitreous. The wound of entrance was enlarged and an effort made to draw it out with the giant magnet. Much to our surprise our efforts to dislodge it failed. An X-ray plate was then made and the foreign body localized in the sclera near the optic nerve, partly in and partly out of the eye. After thinking over the matter, it was decided to attempt its removal by way of the orbit. Under general anæsthesia the external rectus muscle was divided and secured by means of a suture. The eyeball was then rotated inwards as far as possible and hugging the eyeball on the temporal side the orbital tissues were pushed aside until with a probe the optic nerve could be felt. Although adrenalin had been injected into the tissues, there was considerable bleeding, which rendered the search difficult. In the end, however, a black point was seen protruding from the sclera, and Dr. Woolsey quickly grasped it with forceps and drew it out. Since the operation the vision of that eye has improved to 5-20.

DISCUSSION. Dr. Woodruff: I would like to ask if Dr. Jennings tried the piece of steel with the magnet afterwards to see whether it was really attracted by the magnet, whether it was magnetic or not?

Dr. Loeb: How is the movement of the eye since the reattachment of the muscle?

Dr. Jennings, in closing: The movement had been perfect. In answer to Dr. Woodruff's question, I did not try the magnet after the removal of the foreign body, but as it was a chip of steel from a rail, I suppose it would be attracted as any other piece of steel. The reason the magnet did not pull the steel out was that it was deeply embedded in the sclera.

ROYAL SOCIETY OF MEDICINE, SECTIONS OF NEUROLOGY, OPHTHALMOLOGY AND OTOLOGY.

WILLIAM THORNBURN, F. R. C. S., IN THE CHAIR.

At the meeting of February 26th, a discussion on Nystagmus was opened by Mr. W. T. Holmes Spicer. He traced the history of our knowledge of the condition and showed how the movements of the eyeballs varied from large and obvious excursions down to the finest of movements which could only be detected with the ophthalmoscope. Out of 200 cases, he found that in nearly 50 per cent the movements of the eyes were in a horizontal direction; about 15 per cent were rotary, about 12 per cent vertical; 4 per cent had mixed movements; 2 per cent were irregular; 2 per cent circumductory; 1 per cent were condivergent or disjunctive, and a few were odd and unclassified. The horizontal and vertical forms varied greatly in rapidity of movement and in range, and they were nearly always conjugate; but in a few cases they were con-divergent. The rotary cases were nearly always conjugate, but con-divergent ones had been seen.

Circumductory movements were usually conjugate; he had never seen one which was not. They were often rhythmical. Use of the eyes was essential to the existence of nystagmus. The eyes were quiet during sleep, and sometimes so in the dark. It sometimes happened that on covering one eye, oscillations commenced in both. Unilateral nystagmus was not uncommon, and the movements were usually vertical, but not always. If the nystagmus had been recently acquired, a sensation of movement of objects was produced; but this was never noticed in the congenital cases. Nystagmus did not occur in those born blind or who became so very soon after birth. It often became more marked with fatigue; in some cases light produced it, and in some it became more apparent in the dark.

He described the well-known fact that after watching objects moving in one direction a negative after-movement of stationary objects was seen, which made them appear to go in the opposite direction. Some persons were able to produce nystagmus at will.

The most important causative factor in producing nystagmus was a defective retinal image, due to either a corneal or a lenticular lesion, or to some abnormal nerve or retinal condition. Errors of refraction had not been proved to cause this, but corrections of high degrees of astigmatism had often led to great improvement, or even to cessation of the nystagmus. Many of these patients had large refractive errors. Albinos and those with excessive pigmentation often had nystagmus. The pigment which affected eyes in this manner was usually supposed to be that of the retinal epithelium, but this could not be recognized by the ophthalmoscope, as the choroidal pigment masked it, and this might really be the case in those which were not obviously albinotic. In some cases the nystagmus was hereditary, but its cause not definitely ascertained.

As regards occupation-nystagmus, the weight of evidence was on the side of bad fixation being the primary cause and, besides miners, compositors were often affected. In spasmus nutans, the head movements preceded the nystagmus by a few weeks, and they bore no relation to each other. This condition was supposed to be due to an instability of the motor centers.

Mr. Spicer also briefly mentioned myoclonic nystagmus, injury cases and those of toxic origin.

Dr. James Taylor said that nystagmus, though usually associated with visual defects, was sometimes due to labyrinthine and nerve diseases, and he gave briefly the anatomical relations between these organs. With regard to the brain, nystagmus was most likely to follow disturbance of some co-ordinating mechanism in near relationship to the mid-brain, pons and cerebellum. He discussed the mechanism of this theory. It was seen in disseminated sclerosis, Friedreich's ataxy, and syringomyelia. It was common in cerebellar disease, and in unilateral lesions. In most cases of cerebellar disease nystagmus was found, as also it was in local lesions in the vicinity of Deiter's nucleus. Besides the central motor mechanism, the peripheral nervous mechanism might produce it. The muscles themselves might cause it, as in myasthenia gravis. He thought that some of the conditions he had pointed out might be taken into consideration in order to explain the presence of nystagmus associated with visual conditions.

Mr. Sydney Scott said that labyrinthine conditions undoubtedly produced nystagmus. Rhythmic nystagmus might be produced in normal people by applying excessive stimuli to the semicircular canals, such as by rapid rotation, irrigating the ear with hot or cold water, or the galvanic current. He described the anatomy and the physiology of these canals, and expressed the view that "the deviation of the head and eyes is in the same direction as the current in the endolymph, and the nystagmus is in the opposite direction." He described the effect produced by stimulating each of the three canals by rotation of the head in the different planes, and also by the galvanic current.

He had met with 23 examples of the "fistel symptom," and in nearly every case he had been able to verify the existence of a labyrinthine fistula, though many cases of fistula occurred without the "fistel symptom" being produced. As regards spontaneous labyrinthine nystagmus, it resembled induced nystagmus in kind and degree, being always symmetrical and generally unilateral. The less acute forms were sometimes seen in cases of acute or chronic otitis media. Spontaneous rhythmic rotary nystagmus to one side was also met with wher the opposite labyrinth had become functionless, and disappeared again when both became destroyed.

If the labyrinth were stimulated in cases of total blindness, such as resulted from primary optic atrophy unaccompanied by intracranial disease, rhythmic nystagmus could be provoked by rotation or irrigation. When one labyrinth was defunct, spontaneous nystagmus could be arrested by pressure on the carotid sheath of the normal side. It was possible to measure the strength of the stimulus required to produce nystagmus, for sometimes it was easier to be obtained on one side than the other. He described the various methods.

Cases were exhibited which illustrated various forms of nystagmus.

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ROYAL SOCIETY OF MEDICINE, SECTIONS OF NEUROLOGY, OPHTHALMOLOGY AND OTOLOGY.

Sir Anderson Critchett, C. V. O., Bart., President of the Section of Ophthalmology, occupied the chair at the resumed discussion of nystagmus on March 4th.

Dr. T. Lister Llewellyn dealt with the relation of miners' nystagmus to general nystagmus. In the former the oscillation of the eyeballs was only one—though an important one—of the physical signs and symptoms. In miners the nystagmus produced marked subjective symptoms, while in the ordinary person with nystagmus he might not have noticed it. In miners the oscillation was of a rotatory character, and was usually equally marked in both eyes. The nystagmus was increased on exertion, or by making the patient look up. It was usually brought to a standstill when the eyes were directed downwards. In general nystagmus the eye oscillation was generally lateral. The conditions producing nystagmus were those causing an inexact image to be formed on the retina; this was so in optic atrophy, marked errors of refraction, and corneal opacities. Albinism, with its lack of visual definition, was always associated with nystagmus. In dull illumination there was a tendency to use the peripheral portion of the retina. Arlt and Edridge-Green suggested that the movements had the object of bringing fresh portions of the retina into play. The miner in his work not only found great dullness, but almost a complete absence of color-relief. In the better lighted mines there were but few cases of nystagmus. He related some very interesting observations on the lighting power of reflections from ordinary walls, which was practically absent from the face of the coal. Moreover, to be out of the way of the pick, the lamp was often six feet or more from the face of the coal, and the available light was often not more than one-third of a candlepower, and it fell on a substance capable of absorbing 86 per cent of the rays. Safety-lamp pits were hotbeds of the disease. Of 900 consecutive cases of miners' nystagmus, 870 had worked with safety lamps and 30 with candles, and 20 of the latter had at some time worked with safety lamps. He had noticed that several of the most severe cases of miners' nystagmus had fair hair and light-colored eyes. He did not agree with Snell that miners' nystagmus was due to the strain produced by the unnatural position of head and eyes while holing; the man really looked straight at the spot to which he directed his pick. Moreover, working in an unnatural position in a good light did not cause the disease. These patients complained of loss of sight, especially at night time; of headache, giddiness and intolerance of light. Marked cases caused mental depression, and there might be tremor of eyelids, eyebrows and even of the shoulders. The ultimate cause of the condition was want of co-ordination in the mid-brain ocular center of Gowers, governing the associated movements of the eyes.

Dr. Dan McKenzie expressed agreement with the remarks of Dr. Llewellyn, as he found, while practicing in a Scottish mining district, that there were very few cases of nystagmus among the miners, and they used naked lights; hence the illumination was superior to that given by the safety lamp. He proceeded to deal with the subject of vestibular nystagmus. He agreed that the movement of the endolymph in the semi-circular canal was never a steady round-and-round circulation. It was a wave-motion. He suggested that usually the rise or fall in endolymphatic pressure in the ampulla was quickly relieved by local excess of fluid passing into the finer position of the canal, and so round its undilated end, and this rapid equalization of pressure prevented undue stimulation of the end organ. But when there was sustained pressure, as in continued rotation, the relief could not be brought about sufficiently rapidly, and excessive stimulation of the nerve ending would ensue, causing nystagmus and vertigo. With regard to spontaneous nystagmus of the labyrinth storm, the direction of this nystagmus should not be taken as the faithful guide as to which was the affected labyrinth, or to distinguish acute labyrinthitis from cerebellar abscess. He urged that the vestibular tests should be employed in all cases of mild or severe perceptive deafness, as it was useful for diagnosis and prognosis. He gave particulars of 36 cases, and drew the lessons from them.

Mr. R. J. Coulter (Newport) endorsed the views put forth by Dr. Llewellyn, and agreed that there was a neurosis as well as the oscillation of the eyes in subjects of miners' nystagmus. The idea that it was due to gases in the mine was quite given up. He exhibited a safety lamp which had been used eight hours, one not yet used, and an electric miners' lamp, and narrated a case in which a miner, about to give up work on account of nystagmus, was provided with an electric lamp and was still working, some two months later.

Mr. N. Bishop Harman said he had examined the records of one thousand blind children that had come under his care during the past ten years with regard to the occurrence of nystagmus. Of the total as many as 289 showed nystagmus, or more than 25 per cent. There were some very striking differences in the distribution of the symptoms—some groups were free from the symptom, whilst others showed it in almost every case. He grouped the causes of blindness into three. Surface disease damaging the cornea. Purulent ophthalmia in the new-born accounted for most, and in this group almost every case showed nystagmus. Purulent conjunctivitis causing blindness in later years, from six months to seven years, was rarely accompanied or followed by nystagmus; only one certain case was found and there was in this a complication due to middle ear disease. Again, severe ulceration of the cornea due to phlyctenular keratitis was never found to be associated with nystagmus. He thought this indicated that the first few weeks of life were of paramount importance in establishing the function of the macula and steady fixation; once that were established the front of the eyes might be damaged beyond repair without losing this steadiness.

In Group II he placed all forms of uveitis. Most were due to inherited syphilis. Here there was a marked contrast according as the uveitis affected the front or the back of the eye. In 160 cases of interstitial keratitis, most of severe order, there was no case of nystagmus; in 30 with posterior choroiditis there were 4 cases; in 181 cases of optic atrophy, with or without disseminated choroiditis, there were 94 cases of nystagmus. On the other hand, sympathetic disease which caused both anterior and posterior uveitis did not show nystagmus, at least there was none in his 16 cases.

Group III comprised all manner of congenital defects. There was a striking difference between the occurrence of nystagmus in cataract of ante-natal and post-natal origin. In ante-natal cataract of all forms it was very common, being seen in 40 out of 94 cases. It was not seen in post-natal cases, for of 30 only one showed nystagmus and in that the date of origin was uncertain. In such congenital defects as albinism it was always present. It was very frequent in all forms of macular defect, and in family choroiditis. But it was infrequent in buphthalmia and in retinitis pigmentosa, and this rather gave point to the hypothesis of the inflammatory origin of these conditions.

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ROYAL SOCIETY OF MEDICINE.

RESUMED DISCUSSION ON NYSTAGMUS.

The third meeting of the Sections of Neurology, Ophthalmology and Otology was held on Wednesday, March 11th, to conclude the debate on Nystagmus. The chair was occupied by the President of the Section of Otology, Mr. Richard Lake.

Dr. Wilfred Harris said nystagmus should not be assumed to exist unless the lateral movements were persistent and rhythmical during the test; the observer should also determine whether the nystagmus was a symptom of cerebro-spinal disease, or was of ocular origin. Cases which did not belong to either of these groups, such as head-nodding, should also be recognised, and in the last-named form usually only one eye was affected. If, in early infancy, macular development was interfered with, such as by anterior polar cataract, so that there was not a clear image on the fovea, the cerebral co-ordination was not brought into play to keep the eye rigid, hence there were constant oscillatory movements. Ocular nystagmus might be said to be due to disease of the afferent path concerned with the reflex for fixation of the eyeballs. Occasionally in adults nystagmus might be due to defect of vision, and it might be unioeular. In nystagmus of central origin, the symptom was brought out especially on deviation of the eyes laterally or upwards, and was not apparent on fixation in the median line. Most intense nystagmus was occasionally set up by a tumour of the cerebrum, especially if the optic thalamus were involved by it. He mentioned cases of this, and recalled that Gowers made the same observation. The value of nystagmus for cerebral localisation was not great, but it was usually suggestive of cerebellar disease. The most intense nystagmus might be an accompaniment of sub-tentorial disease.

Dr. Abrahams explained the modus operandi followed by him in obtaining cinematographic records of nystagmoid movements. He said the human eye was a very capable micrometer, and was capable of appreciating a movement which the camera did not reveal. Some of the movements photographed were less than 1/10th of a millimetre, and pictures were taken at the rate of 25 to 30 per second. Miners' nystagmus was too fine to photograph.

Mr. O'Malley dealt with the two great types of nystagmus, ocular and vestibular; and exhibited tables of useful-subclassifications, with suggestions as to aetiology.

Mr. Harold Grimsdale spoke of his experiences with cases at the Royal Normal College for the Blind. Half the cases of nystagmus there had had ophthalmia neonatorum; and there were a large number of cases in which the nystagmus followed an accident to the cornea. Up to the age of 5, any severe disturbance of the cornea seemed to be followed by nystagmus. But the blind Principal, who lost his sight at the age of 4 following measles, showed no nystagmus. It was said that nystagmus never occurred in blind children, but he quoted a case to the contrary; the patient, a child, later recovered a fair degree of vision, and the presence of the nystagmus led him to hope that that might be so.

Mr. Cridland dealt with the question of the restriction of the fields of vision for red, blue and white in subjects of miners' nystagmus; this could be observed in the early stage and the improving stage of the condition. He possessed some 70 charts to illustrate the fact that in practically all cases contraction existed for red, blue, and white, but it was of the concentric type, and more or less symmetrical in shape. Occasionally there was an interlacing of the three fields. The restriction might persist even months after both subjective and objective signs had disappeared. Most of the cases showed blepharospasm, neck twitching, etc. The changes in the fields were akin to those seen in functional disease, and that lent support to the view that miners' nystagmus was a nervous condition.

Mr. Angus Macnab spoke of the relative importance of the rods and cones in different degrees of illumination. With light reduction, the rods became the more important until the threshold of stimulation of the cones was passed. In the macula there were only cones, no rods, and after an eye had been subjected to low illumination, it gradually became adapted to its environment, and passed into a condition of dark adaptation. Miners' nystagmus was noticed to be most prevalent where the coal was most absorbent of the little light there was; and the fixation of the subjects was in a state of very unstable equilibrium. The concentration of the miner on his blows also helped, in these circumstances, to produce the neurosis. He thought the influence of refractive error in the causation of nystagmus must be very small, though errors of muscle-balance might have some weight. It would be interesting to ascertain what proportion of affected miners suffered from heterophoria.

Mr. Layton said there were great differences of opinion as to the value of vestibular nerve tests, including nystagmus, in the diagnosis of nerve diseases. He raised the question as to how much of failure to correctly perform co-ordinate muscle movements was due to withdrawal of cerebral control, and how much to defect of the vestibular nerve. He was convinced that in a certain number of cases vestibular reactions when correlated with evidence obtained from other sources would enable one to clinch a diagnosis, or detect a gross lesion which otherwise would seem equivocal. He thought every neurologist should learn to do these tests, or send his patients to an otologist who could do so.

Dr. Rugg Gunn spoke of nystagmus as it affects albinos. In diseases of the retina associated with degeneration of the rods, there was the converse condition to night-blindness. An eye in that condition looking at the spectrum of sunlight, found the red end shorten and disappear, while its broadest portion appeared to move towards the violet end. It occurred to him that if in the albino the cones were found to be functionless, this absence of function in the fixation point was a sufficient cause for the nystagmus, and also, perhaps for the intense photophobia found. Such a person would be dark-adapted. He described the case of an albino, one of nine observed, in which this was so.

Mr. G. J. Jenkins spoke of labyrinthine nystagmus in its relation to various canals, and Mr. Parsons asked whether the albino described by Dr. Rugg Gunn was colour-blind, because totally colour-blind people showed the characteristics described.

Mr. Holmes Spicer, Dr. James Taylor, and Mr. Sydney Scott replied, and the President suggested that perhaps a committee of representatives of the three Sections might present definite conclusions from the various points of view.

C. Devereux Marshall.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of March 21, 1914.

DR. AUFMWASSER PRESIDING.

Vossius Lens Ring.

Dr. G. L. Strader presented a boiler maker whose left eye had on March 3rd been penetrated by a piece of steel 1/3 inch long. The wound began at the temporal limbus and passed through the sclera. The piece of steel had been easily withdrawn through the wound of entrance by means of the magnet, and there had been no reaction. The eye was not seen again for about a week, but at this time the condition was noted for which the patient was presented. In a position corresponding to that of an average sized pupil there appeared at the surface of the lens a distinct ring, which seemed to be made up of very fine dots, there being finer dots in the center of the ring, and also one quite large one. The ring had begun to disappear four or five days before the meeting, and was now rather hard to see. Dr. Strader referred to Vossius' original report of six cases, and to two cases reported by Gifford in 1909; and discussed the various theories of causation. The ring was only visible through the ophthalmoscope.

DISCUSSION.—Dr. Jackson referred to the recent work of Prélat, in which rabbits' eyes were experimentally injured by arrows tipped with indiarubber. Microscopic examination agreed with Gifford's observation that the superficial layers of the lens were injured. Dr. Jackson thought that the reason why the opacity could not be seen by oblique illumination was that the opacity was due to disturbance of refraction in the anterior layers of the lens.

Orbital Injury by Glass.

Dr. Otis Orendorff gave an account of an injury which had occurred to himself. Two weeks previously in cranking his automobile his spectacle lens was broken and fragments driven probably about an inch into the soft tissues at the upper part of the left orbit. There had been a rather sharp cellulitis. Several particles of glass had been removed at the time of the injury, but it was probable that there were a number of small fragments deeply imbedded, and that these were responsible for persistent irritation and discharge. For a time there had been paralysis of sensation over the area supplied by the supraorbital nerve, but the area of numbness had been reduced to about half its original size after removal of one of the pieces of glass.

DISCUSSION.—Dr. Black referred to a case in which particles of wood had continued to appear at the surface for several months after the original injury.

Dr. Patterson referred to a case in which a piece of glass had remained imbedded in the forehead for a long period without signs of irritation.

Dr. Coover spoke of the case of a baby who had been injured by a nursing bottle, six or seven pieces of which had been removed. Quite recently, eighteen months after the injury, a good sized piece of glass had become palpable just beneath the skin.

Orbital Injury by Splinters of Wood.

Dr. Edward Jackson reported the case of a man whose left orbit had been penetrated by a piece of wooden molding, which passed through the upper lid. The patient first came on account of diplopia, and was found to have left hypophoria of 4-5 centrads in the primary position, increasing to 9 or 10 centrads on looking down. At the left external canthus there was a ragged scar, apparently involving the lower half of the externus tendon. The patient returned almost a year later. The diplopia had almost disappeared until two weeks previously, since when there had been a swelling at the outer canthus which proved to contain pus. No necrosed bone could be found with a probe, but for a year or more the patient came in from time to time on account of reopening of the small sinus, with evacuation on two occasions of splinters of wood. The patient had been advised that there was possibly some wood still left against the wall of the orbit; but that complete exploration would require an extensive operation under general anesthesia.

Headache from Large Middle Turbinates.

Dr. W. C. Bane reported the case of a young woman careful correction of whose refractive error had failed to relieve persistent frontal headache, which had disappeared entirely after removal of a portion of each middle turbinate. The headache had apparently been due to pressure of the turbinates against the septum. The usual characteristic of headache from this cause was that it was worse in the morning and got better during the day.

Rapid Reduction in Astigmatism.

Dr. Edward Jackson reported the case of a man who at the age of nineteen had required R. —2.25 sph. ⌢ +3.00 cy. ax. 100°, and L. —3.25 sph.. ⌢ +2.75 cy. ax. 80° ; but who, on returning twenty-eight months later, had taken R. —2.25 sph. ⌢ +0.25 cy. ax. 110°, and L. —3. sph.+0.50 cy. ax. 50°. At the first examination the ophthalmometer reading was R.+3 cy. ax. 100°, L.+2.5 cy. ax. 85° ; and at the later one R.+2 cy. ax. 95°, L.+2. cy. ax. 85°. Thus both cornea and lens had had a part in the unusually rapid reduction of total astigmatism.

Blindness from Disease of Optic Chiasm.

Dr. Edward Jackson reported the case of a man of twenty-six years who in November last had become rapidly blind in both eyes. There had been several partial recoveries of vision and several relapses. On December 8th the vision of each eye was shadows. Wassermann test and nasal and X-ray examinations were all negative so far as offering any explanation of the eye condition was concerned. Loss of sight had begun with a haze in the middle of the field. The patient was six feet six inches in height, but belonged to a tall family. The discs were clear, possibly rather white. Under sodium salicylate there was distinct gain in vision, which was poorest in the center of the fields. When after eight days vision had improved in each eye to 1/150, it was found that the temporal fields were blind. The blood pressure was 148 mm. On January 31st R. V. was 1/20 m., L. 1/15 m. The later treatment had included thyroid extract, with continuation of the salicylate. There seemed to be no question that the lesion was in the chiasm. Towards the end of the treatment, the steady improvement had pointed to a neuritis in the chiasm, more akin to a retrobulbar neuritis than to any other condition, at first so severe as to cause complete blindness, and later clearing so as to show distinct scotoma.

DISCUSSION.—Dr. Neeper had had three cases of transient complete blindness, one lasting several days with relapses. One cleared up after an intra-sphenoidal operation, another after a rapid burst of secretion from the nose, mixed with blood.

Squint of Amblyopic Eye, Cured by Correction of Good Eye.

Dr. W. H. Crisp reported the case of a boy aged nine years who had been brought with a request for operation on account of convergent squint. The right eye had turned in since the age of one year, and several refractive corrections had been worn, beginning at two and a half years. Vision was R. 1/40 m., with poor fixation, L. 4/5 pt. The following lenses were being worn; R.+2.50 sph.⌣+0.50 cy. ax. 90°. L.+0.25 sph.⌣+0.50 cy. ax. 90°. There was convergence of 23 centrads. The vision of the right eye was not improved by any lens. Under cycloplegia full correction of R.+3.75 sph.⌣—1.50 cy. ax. 5°, L.+3.25—1.50 cy. ax. 5°, was given. The squint was now only apparent when the boy was fatigued. The case was of interest in that the convergence of the right eye seemed largely to depend upon accommodative strain in the left and seeing eye; probably as the result of the coordination of excessive innervation to the internal recti with undue accommodative effort.

Apoplectic Quadrant Anopsia.

Dr. W. H. Crisp reported the case of a woman of forty-two years, of robust health and negative history, who had come on account of the sudden appearance of a cloud over the upper nasal corner of the right visual field. The disturbance had come on with severe headache and a sense of dizziness. The right field in the quadrant complained of was contracted about half way to the center. The eyes were in every respect otherwise normal, the fundus presenting no arteriosclerosis. There was low compound hyperopic astigmatism, which had not previously been corrected. Four months later the condition of the eyes and the outline of the field were the same, and the patient had had no further trouble.

Standardization of Test Types.

Dr. Edward Jackson demonstrated two small cards of test type, upon which an attempt had been made to standardize the visual acuity in uniformity with the international broken ring test, especially in relation to the fact that the apparent visual acuity varies for different letters of the same size.

William H. Crisp, Secretary.

Editor Ophthalmic Record,
Chicago.

Dear Sir:—

In the Texas State Journal of Medicine, May, 1914, appears an article by Dr. L. H. Lanier of Texarkana, Tex., on the subject of Vernal Conjunctivitis: Its Symptoms and Treatment. Dr. Lanier makes this remark under the head of *Prognosis*: "The prognosis is good as regards the ultimate outcome, but bad as regards the duration. We know of no remedy for curing the disease or for preventing its annual return. The disease is incurable. The treatment must be limited to the amelioration of the subjective symptoms."

I feel compelled to challenge this statement of Dr. Lanier's, and if he will refer to the Ophthalmic Record of October, 1903, he will find an article written by me on the subject of Vernal Conjunctivitis, where an absolute cure of this disease at the height of its existence was obtained. The case was that of a young lady of Kentucky who had a well-marked case of vernal conjunctivitis of both eyes. I treated this young lady during one season with ordinary remedies with no beneficial results whatever. Upon the advent of her trouble the next season, however, I placed her under entirely different treatment and effected a complete and permanent cure.

The treatment consisted in the amputation of the growths and the treatment of the stumps with X-ray exposures under the direction of Dr. W. A. Pusey of Chicago. The patient began to improve under the first few exposures, was rapidly cured and has never had a recurrence of the disease from that time to this. Her lids are perfectly normal and no scars have been left. This case was seen by Dr. Pusey, Dr. Casey Wood, Dr. Paul Guilford, Dr. T. A. Woodruff and others. I have seen her once or twice a year since and have shown her to many oculists. This same treatment has been used by me in several other cases and by Dr. Casey Wood and others with success. So far as I know, this case which I reported in October, 1903, was the first case of *cured* Vernal Conjunctivitis ever placed on record, and so far as I know, the treatment which I have outlined for this disease is the only treatment under which absolute cures have been secured. This treatment is mentioned in various text-books and I am surprised that it was not mentioned by Dr. Lanier in his otherwise excellent article.

Cordially yours.

FRANK ALLPORT.

The second annual meeting of the Pacific Coast Ophthalmogical and Oto-Laryngological Society was held in Seattle July the first, second and third. Colonel Robert H. Elliot of London, England, opened the program on the first afternoon of the session with a paper on Glaucoma and his trephining operation for its relief.

The following morning was set aside for clinical purposes, and ample material was available for Col. Elliot to demonstrate his operation. In fact the clinic was so admirably conducted that it was possible for each one of the fifty surgeons present to view at least two operations at close range.

A. H. KIMBALL, Washington, D. C. (*Journal A. M. A.*, April 4), gives an account of a soldier in the Government Hospital for the Insane, a case of dementia praecox, who within seven months prior to the report had been in the habit of pushing the index finger along the side of the left eyeball so that he had finally been able to bring it out of the socket, outward and downward along the side of his nose. The performance did not seem to cause pain nor prevent the spontaneous return of the eye to its proper position, leaving only about 4 mm. of exophthalmus projection. There was complete atrophy of the left optic nerve. The return of the eye was rapid for about three quarters of the way and then slower. Kimball remarks that one of the most difficult features to understand in this case is how, after all the stretching they have undergone, the eye muscles retain their tone. So far the patient has made no attempt to meddle with the right eye. The article is illustrated.

NEWS AND NOTES.

Personals, and items of interest should be sent to Dr. Emory Hill, 122 South Michigan Avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. E. N. Robertson of Concordia, Kas., is in Europe to attend the Clinical Congress in London and pursue studies in Vienna.

The annual meeting of the Wisconsin Eye, Ear, Nose and Throat Specialists will be held in Oshkosh on October 8.

Dr. Casey A. Wood of Chicago has sailed for Europe, where he will attend the International Congress at St. Petersburg and the several congresses in England this summer.

A special building for the work of the eye, ear, nose and throat departments has been opened at the London (Canada) Victoria Hospital.

A testimonial banquet has been tendered to Dr. Horace Bonner on the occasion of the completion of twenty-five years of service on the staff of St. Elizabeth Hospital, Dayton, Ohio. Dr. J. W. Millett was one of the speakers.

The Nashville (Tenn.) Eye Infirmary, conducted by Drs. Duncan Eve and Paul F. Eve, has been closed owing to the dissolution of the partnership of the owners.

The following appointments have been made in the department of ophthalmology at Rush Medical College, Chicago: Drs. Henrietta M. Farquharson, Harry D. Belt, and J. Wendell Clarke, associates; Dr. Emory Hill, assistant.

The annual meeting of the Maine Eye and Ear Association was held in Portland on June 10. Dr. E. E. Brown of Bangor was elected president, Dr. Frank Y. Gilbert of Portland, vice-president, and Dr. E. E. Holt, Jr., of Portland, secretary-treasurer, for the ensuing year.

Dr. A. C. Bartholomew has moved from South Bend, Ind., to Van Wert, Ohio, and Dr. James W. Shaul has moved from New York City to Los Angeles, Cal.

Dr. Sherman Voorhees of Elmira, N. Y., was seriously injured in an automobile accident July 5. Mrs. Voorhees was instantly killed and their son, Sherman, was also injured, but pluckily went for assistance.

Dr. Mark J. Schoenberg has received the Lucien Howe prize in ophthalmology awarded by the New York State Medical Society. Dr. Schoenberg's contribution is the result of research on Ocular Anaphylaxis.

The following have been appointed to the faculty of the College of Medicine of the Ohio State University: Drs. C. F. Clark and Andrew Timberman, professors of ophthalmology; Drs. C. S. Means and G. C. Shaffer, instructors in ophthalmology; and Dr. I. G. Clark, assistant in ophthalmology.

Of interest to ophthalmologists is the forthcoming meeting of the Illuminating Engineers' Society in Cleveland during the week of September 21st. The committee chairmen have held one meeting and are making preparations for a large attendance. The headquarters will be at the Hollenden Hotel. Mr. A. G. Summerell is chairman of the Hotel Committee.

A Conference of Physicians of the U. S. Indian Service of the Northwest was held at Fort Lapwai (Idaho) Indian Sanatorium, June 23-25, under the chairmanship of Dr. Joseph A. Murphy. One day's session was devoted to consideration of eye diseases and papers read on the subject of trachoma by Drs. W. H. Harrison, O. S. Phillips and B. J. Lloyd.

The following deaths of ophthalmologists are announced:
Dr. William F. Robeson of Pittsburg, aged 50.
Dr. James A. Blake of Brooklyn, aged 71.
Dr. William H. Searles of Oshkosh, Wis., aged 74.
Dr. William S. Ross of Altoona, Pa., aged 60.
Dr. James G. Schall of Leadville, Colo., aged 38.
Dr. George Strawbridge of Philadelphia, aged 68.

A study of trachoma by the U. S. P. H. Service in western Virginia, West Virginia and Kentucky has revealed 340 cases among 20,848 persons examined, and 108 cases among 7,801 in another investigation. These were largely school children in the more remote mountain districts. Trachoma is almost unknown in the counties between the mountains and the seashore. Such results are especially interesting in view of the facts that the negro is practically immune to trachoma and that there has been very little foreign immigration into the district studied.

The first award of the Herman Knapp Medal for original research work in ophthalmology was made to Dr. Clifford B. Walker of the Massachusetts Eye and Ear Infirmary. Dr. Walker's researches are embodied in a paper read at the recent A. M. A. meeting at Atlantic City, entitled "The Diagnostic Value of the Hemiopic Pupillary Reaction and the Wilbrand Hemianopic Prism Phenomenon with a New Method of Performing the Latter." The committee which makes this award administers the Herman Knapp Testimonial Fund supported by members of the Section on Ophthalmology of the American Medical Association. The fund provides the Knapp medal and also the transactions of the section and the Year Book.

A noteworthy achievement of a blind man is recorded in a New York daily paper. Patrick J. McNamara has been an inmate of a home for the blind since losing his sight 30 years ago from the explosion of a defective bottle. He has worked for years on inventions for the purpose of making the bottle industry safer. The results are three useful devices. One is an automatic check-valve to prevent staleness of beer through the escape of gas after a barrel is tapped. Another is a stopper for champagne bottles to prevent the escape of gas while allowing free drawing of the wine. A third is a lock-stopper for bottles containing poisons, which allows the withdrawal of the contents when the stopper is unlocked by a key without removing the stopper and renders withdrawal impossible when the stopper is locked.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
[illegible] P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.).	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

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ORIGINAL ARTICLES

SAMOAN CONJUNCTIVITIS.

BY DR. C. F. ELY, SURGEON U. S. NAVY, TUTUILA, AMERICAN SAMOA.

[At the request of one of the Editors of the OPHTHALMIC RECORD, Dr. Ely has kindly prepared the following report on this interesting disease. At the present moment he is making cultural and other experiments in the hope of throwing further light on the rather obscure etiology of the disease, and promises to furnish us with the results of these investigations.—C. A. W.]

Your communication asking for information regarding Samoan conjunctivitis reached me some days ago, and I am very glad to furnish you a resumé of the opinions expressed by different medical officers on duty here in years past, the opinion of Dr. Leber, the German eye specialist, on duty in German Samoa, and finally my own opinion.

EXTRACTS FROM REPORTS BY DR. ROSSITER, SURGEON, U. S. NAVY, 1908.

"That the type of Conjunctivitis so prevalent in Samoa, and which in lieu of a better definition, I will call "Samoan Conjunctivitis," is a distinct, acute, infectious disease, characterized by rapid onset, severe pain, photophobia, a high grade of conjunctival inflammation, soon becoming purulent, a tendency to corneal destruction over greater or less areas, and the presence in the discharge, often in pure culture, of its etiological factor, a distinct micrococcus described below.

Geographical Distribution and History:—Nive, Roratoga, New Guinea and other island groups of the South Pacific. It is prevalent throughout the entire Samoan Group. Little can be learned of its history. It appears to have been endemic as long as the natives can recall, but to have become much more prevalent since an epidemic of Morbilli which visited Samoa in 1893.

Etiology:—In all the cases examined microscopically a micrococcus described below was found. In all but two of these cases, examined before the third day, the organism was obtained in pure culture from the conjunctiva and from the sticky, mucid discharge. In the cases where a mixed infection was found, the special organism was found in connection with the Pneumococcus, or Staphylococcus Pyogenes Aureus, or both. In no case examined, not suffering from the disease within two months, was the specific organism found. The disease is widely prevalent in Samoa, and is probably transmitted from eye to eye, and from person to person, by the hands, by flies, and by dust. This type of conjunctivitis may occur at any age, but it is rare under six months and in the aged.

Symptoms:—The exact period of incubation is undetermined, but it appears to be about 18 to 36 hours. Usually both eyes are affected at the same time, but often the disease appears first in one eye, the other becoming involved 12 to 24 hours later. The onset is with a slight roughness of the conjunctiva, slight burning sensation, mild photophobia, and a little watery discharge from the eyes. The degree of inflammation increases rapidly and within a few hours a severe form of conjunctivitis exists, in which the entire conjunctiva is deeply injected, small hemorrhages and spots of ecchymosis may be present, and there is marked photophobia, severe burning pain over the infected area, with dull intraocular pain as well. The discharge becomes sticky and mucopurulent, and the lids are glued together, and often swollen and edematous. Corneal complications are common; at first simply as cloudy infiltration, in which stage it is usually arrested by proper treatment; but in improperly treated and neglected cases, going on to ulceration and at times Staphyloma and Iritis. Constitutional symptoms do not appear in the milder cases. In the severer forms headache and a rise of temperature to 100 or 101 degrees F. may be present.

Diagnosis:—The actual diagnosis must be made in the laboratory. Clinically, all the cases of acute, purulent conjunctivitis, which I have seen in Samoa, have been of this one type; but it might be confounded with most of the usual types of acute conjunctivitis, all of which however are rare in Samoa, or with Conjunctivitis Neonatorum, which on account of the rarity of gonorrhoea, is necessarily rare. Within five months I have had brought before me for treatment 157 cases of conjunctivitis, 155 of which were of the type under consideration, the two remaining cases being traumatic in origin.

Prognosis:—In early cases the prognosis is good. Where proper treatment is instituted within 48 hours, complete recovery usually results. Where corneal ulceration has taken place the prognosis depends upon the location and extent of the ulcer. The ravages of this disease in improperly treated or neglected cases are only too evident in the enormous proportion of the population of Samoa who have lost, either in whole or part, the use of one or both eyes from corneal opacities.

Treatment:—The various salts of silver present the best method of treatment. When the first sensations of burning and roughening are felt, one or two instillations of a 5% solution of Protargol will usually abort the disease. Later and before corneal ulceration has taken place, instillations of 5% solution of Protargol two or four times daily will usually affect a cure in five to seven days.

Micrococcus of Samoan Conjunctivitis:—Small micrococcus about .6 to .8 microns in diameter, often seen as diplococci, and when so seen markedly resembling Gonococci; the adjacent margins often being flattened. Stains readily with the usual stains. Is decolorized by Gram's method. (Control Staphylococcus P. A.) Takes Methyl Violet to nearly black. Grows readily on usual artificial culture media, as follows:

Agar Plates: Colonies appear in 18 to 24 hours as small, raised, opaque, moist, rounded discs, with undulate margins.

Agar Streak: Abundant, raised, white, opaque, moist growth.

Bouillon: Uniform turbidity. Fine granular precipitate after three days.

Potato: Abundant, raised, white, opaque, moist growth.

Milk: Grows readily. Not coagulated after six days. No acid formation to litmus milk.

Fermentation: No gas production in bouillon fermentation tubes.

Gelatine: Grows readily in gelatine media, but data as to stab and plate cultures were not obtainable, owing to high room temperature, and lack of cold incubator.

This organism will retain its vitality on any of the above mentioned media for months if moisture is supplied. Grows equally as well at room temperature, which however is high, 85-95 F., as at body temperature.

Pathogenesis:—Found in all cases examined of Samoan Conjunctivitis. Not found in healthy eyes. Although the cultural characteristics of the above mentioned organism have not been obtained for all media on account of climatic and other conditions, yet it is believed that sufficient data have been obtained as to its cultural and staining properties to warrant the assumption that it is an hitherto undescribed organism, and that it is the sole cause of the type of conjunctivitis so prevalent in Samoa.

EXTRACTS FROM REPORT BY P. A. SURGEON COTTLE, U. S. N., OCT., 1910.

A chronic eyelid disease is quite prevalent in the population. The majority of the cases can be called trachoma suspects, a few we are nearly in a position to call undoubted trachoma.

The presence of a granular eyelid disease in a population with thickened lids, cases of trachoma-like ptosis, a few of pannus, some of old adhesions between ocular and palpebral conjunctivae, old opacities of the cornea—are signs which before coming to Samoa would to me have meant the undoubted existence of trachoma. However the presence here of an eye disease called Acute Conjunctivitis (Samoan) by my predecessor is a factor as yet not entirely known. It was his tentative opinion, expressed in a report dated May 8th, 1908, that some of the conditions noted above were late stages of untreated Samoan Conjunctivitis. A longer period of observation than he had is necessary before this tentative opinion can be either supported or denied.

Nov., 1910.—During the stay of the U. S. S. Annapolis in Apia I consulted with Dr. Leber, the German eye specialist, and had a talk with the Acting Governor Dr. Schultz.

The result of this conference is a complete confirmation of the opinions stated in my first partial report dated Sept., 1910. The German doctor however does not agree with me in calling the disease Trachoma. This however is a difference of opinion in terminology rather than in fact or conclusion, because he admits that the disease under discussion so closely simulates Trachoma that he cannot say that I am wrong in advising the same measures for the control that are used in the control of Trachoma. I therefore adhere to the opinion given by Dr. Connor and myself in a letter of Oct., 1910, stating Trachoma is present in Tutuila and also is coming to this port from German Samoa.

My own observations concerning this condition have left me open to conviction. To date my tour of duty here has been taken up by a campaign of Yaws eradication and the sanitation of the Island; at a later period I hope to find time to investigate Samoan Conjunctivitis with the view of determining whether it is a separate nosological entity or trachoma.

EXTERNAL CANTHOTOMY

By Robert Scott Lamb, M. D., Washington, D. C.

This is a plea for the frequent and more general use of the well-known operation—External Canthotomy.

It has been borne in upon me that this operation, which has been so useful to me, and obtained for me such brilliant results, among my private as well as my clinic patients, is not commonly used.

My reasons for adopting this procedure some years ago as a remedial agent in the cure of certain diseases of the eye, are as follows:

First: Under normal conditions ordinary foreign bodies are removed from the bulbar conjunctiva and cornea by the *hoe like* action of the margin of the lids.

Second: It seems to me that when the tissue ulcerates or desquamates the cells are practically foreign bodies, and are, therefore, removed from their healthier neighbors by this *hoe like* action. Hence in these cases of ulcer of the cornea canthotomy immediately removes this constant drawback to healing.

Because of the relief which can be obtained from this operation from pressure and the disintegrating effect of marked hypertrophied follicles of the palpebral conjunctiva moving over the cornea, as in acute virulent infection, such as Gonorrhoeal Ophthalmia or in Parinaud's these cases are amenable to this treatment.

Ulceration of the cornea has been variously treated from time to time, by one means or another, with much uncertainty as to the final outcome of the case. Prognosis has been conservatively "guarded." It seems to me, therefore, that any method which facilitates the healing and adds a strong element of certainty of healing—so that the prognosis can be favorable, and the patient assured of an healed ulcer, and perhaps a smaller scar—or even better—no visible scar, should be followed and broadly advocated.

During the period of investigation of the merits of this procedure, numerous cases of ulcer, ranging from phlyctenular ulcers to marginal ulcers of arteriosclerotic or angiosclerotic origin, the treatment was limited to external canthotomy followed by a dusting of calomel powder upon the ulcer—this for the purpose of cleansing. From four days to a week elapsed before the patients were seen again, and in every case marked improvement was noticed; nothing had been used at home except hot applications. In some few cases the ulcers were almost entirely healed and needed very little additional treatment.

I may say, however, the foregoing limited treatment is not recommended, but was merely used during a period of investigation to see what the effect would be. Nothing in the way of tonic or upbuilding medication is ever neglected in connection with the treatment of these cases from the systemic standpoint; and such local measures as atropin, hot applications or dionin are used as indicated, according to previous teaching.

Undoubtedly the external canthotomy has, in my experience, been a distinct advantage and advance over any previous procedure in connection with the treatment of corneal ulcers. Instead of waiting until an ulcer is in the last stages, and doing external canthotomy as a sort of last resort, it should be done in the beginning when it is remarkably efficacious. It is particularly efficacious in prevention of ulcers in such cases as Gonorrhoeal Ophthalmia where even in children and adults the markedly turgid follicular elements of the conjunctiva are putting pressure upon and scratching the surface of the cornea.

For a period of eight years it has been my practice to use external canthotomy in all cases of Gonorrhoeal Ophthalmia and Ophthalmia Neonatorum as soon as I see the cases, and I may say, without fear of contradiction, there is in each and all immediate improvement. The ability to thoroughly evert the lids in order that they may be quite well cleansed of all shreds of mucus, even those shreds in the culdesacs, which are usually beyond the reach of ordinary means of cleansing—that is by irrigating and swabbing—is an important advantage. Not only that, but during subsequent treatments, applications can be made to the everted lids. The distinct advantage of this is perfectly evident and I am sure will appeal to anyone.

As to the disadvantages I may say that in my experience the amount of distortion of the lids following the healing of such a cut is not so great as I had supposed and had been led to believe; and as a matter of fact in no case, out of some hundreds, have I found it necessary to subsequently do a canthoplasty.

As I have before stated, this procedure of early canthotomy has been done by me, and taught by me, for some years past; and it is only from the fact that in talking with my confreres, who have expressed to me their surprise at the rapidity of healing, the certainty with which the ulcer heals and the brilliant results obtained, even in cases of serpiginous ulcer, and the ulcers following lime burn, that I have learned the possible value of reporting it.

In conclusion I may say that since beginning this treatment some years ago I have never found an ulcer which has not been benefited by it; and it is for the purpose of having others take up the idea which, although it may not be new, has at least fallen into disuse and needs reiterating. I wish to lay special emphasis upon the fact that External Canthotomy should be used as a first resort and not a last.

THE USE OF THE SNARE AS THE FINAL STEP IN THE ENUCLEATION OF THE EYE.

HAL R. WRIGHT, D. D. S., M. D., COLUMBUS, OHIO.

During my short career in eye work it has been my fortune or misfortune to enucleate several eyes and to see many more enucleated by other men. It has often occurred to me during the operations that much blood was lost that could have been saved and I have seen in a few cases too in my own practice where the hemorrhage had reached the alarming stage.

In all cases when the artery and nerve are severed by the old method the socket wells up full of blood and the operator has little or no chance to view the field of operation, this with the hemorrhage stimulated me to the use of the snare for severing the posterior vessels and nerves as the final step in the enucleation of the eye.

In the last two enucleations I have used this method and henceforth I shall use no other. You view a beautiful dry socket where the field of operation and the lay of the conjunctiva can be seen and not guessed at.

Method:

Incising the conjunctiva in the usual manner as near the cornea as possible, the dividing all muscles as close to the sclera as possible, taking care not to button-hole the sclera; now pass the hook entirely around the globe to ascertain if all but the posterior attachments are free, then drop the loop of suitable size to pass over the globe, grasp the eye with the fixation forceps and work the snare wire down over the globe, then slowly close the snare until the ball is free. A strong snare that can be operated with one hand is the instrument of preference.

OUR OXFORD LETTER.

THE OPHTHALMOLOGICAL CONGRESS, JULY 9TH AND 10TH, 1914.

The recent Opthalmological Congress was held under most favorable auspices; the attendance was larger than ever, the weather—an important factor in an English meeting—was very fine and a representative lot of contributors both to the scientific and the social sides of the gathering put in an appearance.

The selection of Oxford for this International Congress is peculiarly happy. The distractions of a large city, like London, for example, are avoided, the environment is distinctly suggestive of peaceful study, and on all sides one encounters most interesting and most beautiful mementos of the progress, literary and other, of the Anglo-Saxon race. I refer not only to the lovely buildings of the various colleges but to the charming old trees, lawns and gardens that surround and form part of them. Not only is Oxford centrally located for British ophthalmologists but the arrangement with the authorities of Keble College, by which the Congress is domiciled within its walls, forms an added charm and is a decided convenience to visitors. Across the street in the Human Anatomy buildings of the University the daily meetings were held, next door to the various exhibits, both scientific and commercial.

On the evening of July 8th, the day preceding the opening session, an informal and introductory dinner was given in Keble Hall, at which the members already in Oxford had an opportunity of breaking the professional and social ice preparatory to the regular program next day. The official dinner of the Congress was held on July 9th, with Professor Arthur Thomson, Professor of Human Anatomy, in the Chair, supported by the Warden of the College and Sir Wm. Osler. Short speeches in reply to toasts were made by the foregoing as well as by two Americans, Dr. Wendell Reber of Philadelphia and the writer of this letter.

Among other Americans present were Marple (New York), Gifford (Omaha), Reeve (Toronto), McReynolds (Dallas), Snyder (Toledo, Ohio), H. Alexander Brown (Reno, Nev.).

In attendance upon the meetings I also noticed Darier (Paris), Westphal (Lausanne), Col. Henry Smith (Amritsar), Sydney Stephenson (the very active and efficient Secretary of the Congress), Doyne (Oxford), the Master of the Congress, Thomson Henderson (Nottingham), Harrison Butler (Birmingham), Richardson Cross (Bristol), Pooley (Sheffield), Jameson Evans (Birmingham), Robinson (Sunderland), Treacher Collins and Jessop, of London, as well as many other ophthalmic surgeons well known in America.

Coming to the program proper it was noted that hitherto there had been no discussion permitted on papers read before the Congress. At this meeting, however, it was decided that five minute discussions should be allowed—a wise provision as the comments made and questions asked furnished not the least valuable of the information derived from attendance upon the several sessions.

On the first day Mr. S. H. Browning (London) reported some interesting biological tests of Sympathetic Ophthalmitis, all looking to toxaemic conditions for an explanation of at least the predisposing cause of this disease. He believes that preparations of the diseased uveal tract, with which he made a number of therapeutic experiments, may aid us in the (autotoxic) treatment of this terrible disease. Harold Gifford repeated his faith in the exhibition of large doses of the salicylates which he also thought might, with advantage, be combined with treatment by salvarsan and mercurial inunctions. He did not think that these drugs are, therapeutically, incompatible with one another in the treatment of sympathetic ophthalmia. The opinion generally held by the Congress seemed to be that early and vigorous measures were generally followed by a successful issue and the recovery or preservation of useful vision in the second eye—a termination not usually expected under the older methods.

The writer then presented an address, illustrated by stereopticon views, on Some Observations on the Eye of the Common Sparrow (*Passer domesticus*); a Study in Comparative Ophthalmology. Although the subject and time allowed for this paper—an hour and a half—formed a combination quite sufficient to bore most audiences the members were so polite as to pay strict attention to it and even "to ask for more."

A very practical paper on The Evolution of Toxaemic Iritis by Mr. A. M. Beaumont of Bath next followed in which he showed that we must reconstruct our etiological tables in Iritis because it is very probable that "rheumatism," and gout have little or nothing to do with the production of iritis although, of course, the disease may occur in so-called gouty and rheumatic subjects. Altogether the causes of iritis are not so decidedly on the surface that one can properly attribute them in this cut-and-dried fashion to the dyscrasia in question. And it must be admitted that many of our most intractable cases of recurrent iritis seem to have no connection whatever with any of the so-called "diatheses." In the discussion that followed, Darier advised the uniform use of antidiphtheritic serum in large doses in all forms of toxaemic-iritis and thinks as good results follow its exhibition by the mouth as by subcutaneous injection.

Next was presented a paper by Mr. G. M. Harston of Hong Kong on the Treatment of Trachoma by Solid Carbon Dioxide, in the course of which he advocated its employment in both acute and subacute cases. He brings about a cure in from three to six months by an average application every ten to fourteen days to the cocainized eye. The dioxide stick is passed over (not rubbed into) the diseased conjunctiva (lids well everted) for 5 seconds to begin with, and this period is increased to 30 seconds after a few weeks or months according to case. Great care must be taken to avoid contact of the remedy with the cornea. Gently run the finger tip over the conjunctival surface to remove possible dioxide spiculae.

Harston claims that the scarring noted in the Fuchs clinic from this remedy is due to too long, too frequent or too rough applications. The after-treatment is a simple collyrium with cold fomentations if the reaction—generally slight—is marked.

In the next paper Dr. Alexander Brown of Reno, Nevada, reported excellent results in this disease by Glass Rod Massage with Iodine. It seems to the writer that both these forms of treatment might be combined, the latter to be used in the intervals of applying the former.

Doyne's paper was the next—a contribution to ocular physiology entitled, (a) The Pupil Under Various Conditions of Illumination. (b) The Movements of the Eye in Reading. This interesting essay was illustrated by the stereopticon.

After luncheon at Keble Hall the Congress adjourned to the Oxford Eye Hospital (founded mainly through the efforts of Mr. Doyne) where Dr. William Robinson demonstrated a rapid method of enucleation by means of deep injections of alypin. Mr. P. H. Adams showed the results of an operation for conical cornea by trephining the opaque area of the cone. These were very good and met with the approval of all present.

But by far the most interesting exhibit and the one that called for most comment and criticism was Mr. Zorab's operation of "Aqueoplasty," available in all forms of glaucoma. His latest modification of the procedure is, after cocaine and adrenaline, to make a preliminary tunnel beneath the conjunctiva to the sclero-corneal margin—much like the preparatory flap in the Lagrange or Elliot operation. A keratome is then passed into the anterior chamber and slowly withdrawn. A loop of wet, sterile, number one, plain, white silk thread about half an inch long is then introduced, by means of modified iris forceps, into the chamber through this opening. Careful withdrawal of the forceps leaves the loop of silk plainly lying on and extending half way over the iris to the medium sized pupil. The margins of the conjunctival wound are stitched together—and there you are with a drainage opening that never closes up! *A priori* this procedure would seem to be a dangerous undertaking to be followed by serious consequences. As a matter of fact Mr. Zorab showed a number of cases all the way from three months to three years' standing that were not only free of present symptoms or increased tension but which appeared to have been saved from blindness. The end of the silk loop was readily seen in *situ,* the drainage seemed to be adequate and constant, while there appeared to be no signs of inflammatory reaction following the operation.

In the Scientific Museum Dr. Thomson Henderson demonstrated his well known Scotometer and showed a tangent scale for its use. He also demonstrated the Angle of the Anterior Chamber in Primates. Dr. S. E. Whitnall gave demonstrations on points connected with the naso-lachrymal duct and the orbit. Dr. Harrison Butler showed a new color-testing lamp; Mr. P. H. Adams a series of ophthalmoscopic paintings; Dr. Harold Gifford several new instruments, including a new muscle clamp for advancement operations; Mr. A. W. Head over a hundred water color drawings of the ocular fundi in mammals and reptiles, while Mr. Rayner Batten gave a curious series of tests tending to demonstrate the lack of relation between most tests for determining the intraocular tension and the real intraocular pressure.

There were, also, many microscopic preparations of great interest that time does not permit of description.

Darier's paper on Some Emergencies in Ocular Therapeutics excited much interest. It was largely a reiteration of his belief in seropathy, especially in iritis and most forms of uveitis. Generally speaking, he finds that antidiphtheritic serum—given *per orem* as well as sub cutem—answers all purposes. He also advises that it be administered as a prophylactic in cataract extraction, especially when one fears the lighting up of an old uveitis or the production of a fresh attack.

Much of his paper was occupied in discussing the relative merits of the various tuberculins and bacillary preparations in the treatment of ocular tuberculosis, with the advice that, as a rule, one should *begin* with small doses of TR and continue with some form of anti-tubercular serum which might well be given by the mouth.

Wendell Reber gave an address on the Present Status of the Heterophoria Question which was listened to with great attention by his audience. Those who have not given much thought to this subject recently should read this admirable paper when it is published.

Mr. G. H. Pooley (Sheffield) spoke of Improvements in Local Anesthesia in Eye Operations and advocated sub-conjunctival injections in operations on the anterior segment of the eye. He prefers the following formula:

Alypin	Gr. xv.
Sodium chloride	Gr. xxi.
Sol. adrenalin (1:1000)	m, x.
Distilled water	ʒiiss

This mixture may be sterilized by boiling. In the discussion several members advised the substitution of novocain for alypin.

Jameson Evans and Harrison Butler's paper on the Results of Modern Operations for Chronic Glaucoma seemed to be a plea for iridectomy; indeed they regarded the following statistics as a vindication of that well-seasoned operation even in chronic forms of the disease. Perhaps, if so few cases can demonstrate anything, the tables point to the desirability of adding, where it is possible, excision of a portion of the iris to other procedures.

STATISTICS OF OPERATIONS FOR GLAUCOMA.

Operation.	Number of Cases.	Vision Improved or Preserved.	Tension Reduced to Normal.
Acute and Sub-Acute Glaucoma.			
Scleral Operations	42	32=76%	35=82%
Iridectomies	28	20=71%	23=88%
Total	70	52=74%	58=83%
Chronic Glaucoma.			
Iridectomies	30	25=83%	21=70%
Trephine	23	17=74%	20=87%
Herbert's Wedge	15	11=73%	12=80%
Holth's Punch	18	13=72%	14=77%
Small Flap	5	2=40%	2=40%
Total	91	68=75%	69=75%
All Glaucomas.			
Total	161	120=74%	127=78%

Lieut.-Col. Henry Smith of Amritsar gave a very interesting talk on the treatment of Incipient Cataract. He believes that the most effective method of staying the progress of the disease is the subconjunctival injection of mercuric cyanate, 1 to 5,000 to 3,000, and he prefers the stronger dose in young subjects, say of 40 to 50 years of age. He relieves the otherwise severe pain of the injection by the subcutaneous administration of a large (half a grain) dose of morphia half an hour before the cyanate. During the discussion of this subject the writer and others expressed their faith in a combination of the mercuric with one per cent acoin and were glad to make public acknowledgment of its efficacy to Darier, who was present at this session. Colonel Smith renewed his belief in expression as the proper method for the removal of cataractous lenses, and this led to an interesting discussion of the whole subject of extraction, which will doubtless be continued at the meeting of the British Medical Association at Aberdeen the end of this month. Colonel Smith has promised the writer to furnish the readers of the Record with his plans for a school of Ophthalmology in the Punjab before long. It ought to be interesting news to his many friends in America.

The scientific program closed by a paper by Mr. Sydney Stephenson on "Bovine Tuberculosis as a Factor in Phlyctenular Affections of the Eye." in which he agreed with our Derby that a very low proportion—perhaps one-third of all cases of phlyctenular disease is tubercular and should be so treated. He is satisfied that an (as yet) unknown percentage of these is bovine and communicated by infected milk.

Casey Wood.

S. Theobald, Baltimore (*Journal A. M. A.*, Aug. 15, 1914), says that the true nature and causation of phlyctenular ophthalmia is of great practical importance, owing to the conflicts being waged over the question whether or not the disease is tuberculous. The advocates of the tuberculous theory have been compelled to admit that the phlyctenules not only never contain tubercle bacilli, but also that they bear no histologic resemblance to true tuberculous tissue. The advocates of this theory now maintain that the disease is pseudotuberculous or paratuberculous, caused by the toxins from the tubercle bacilli present somewhere in the body. The disease, Theobald says, is universally recognized as one of childhood, the cases occurring in adults, he admits, being those in which the "scrofulous" diathesis, glandular complications and not infrequently, definite clinical signs of tuberculosis are found. In these, however, it will generally be found that the disease occurred first in childhood and recurred from time to time in after years. Much the larger number of cases encountered in childhood respond promptly to treatment, and very rarely show any sign of scrofula or tuberculosis. This must be regarded as typical, and conclusions must be drawn from this and not from the atypical cases encountered in adults. A study of the cases shows that the children are well nourished, but that their diet and habitations are everything that they should not be, while in addition to the ocular disorder eczema is present either on the face or elsewhere. Their tongues are usually furred, their bowels torpid and stools foul-smelling. Theobald believes the disease to be the result of endogenous infection from the alimentary canal, and that, as according to Weeks' investigation, the *Staphylococcus aureus* or *albus* present in the phlyctenules are the micro-organisms responsible.

REPORTS OF SOCIETIES

BRITISH MEDICAL ASSOCIATION, ABERDEEN, SECTION OF OPHTHALMOLOGY.

WEDNESDAY, JULY 29, 1914.

Although attendance upon the Ophthalmic Section of the British Medical Association at Aberdeen, the last week of July, 1914, unfortunately clashed in point of date with the Clinical Congress of Surgeons of North America, in London, and for that reason, chiefly, was not quite as large as it otherwise would have been, yet the papers and discussions were distinctly practical and replete with interest.

Among the British Ophthalmic Surgeons present were: E. E. Maddox, Bournemouth; James A. Wilson, Glasgow; Thos. H. Bickerton, Liverpool; C. Devereux Marshall, London; Edridge-Green, London; McGillivray, St. Andrews; Miss E. M. Maxwell, Dublin; J. H. Parsons, London; Thomas Snowball, Burnley; Major McKechnie, India; A. Hill Griffith, Manchester; Arthur J. Ballantyne, Glasgow; A. Maitland Ramsay, Glasgow; A. F. MacCallan, Egypt; C. H. Usher, A. R. Galloway and William C. Souter, Aberdeen.

The American contingent was a small one and included: R. A. Reeve, Toronto; Harold Gifford, Omaha; and the writer.

The principal item on the program was, of course, the paper by E. E. Maddox of Bournemouth on the *Extraction of Cataract.* Although of the discussion and those taking part in it there might be said, *tot homines, tot sententiae,* and that very little really new was elicited, yet it is always educationally worth while to listen to world authorities on this ever interesting subject.

Other symposia were introduced by T. Herbert Parsons, on the Hygiene of Reading and Near Vision, and by Dr. Maitland Ramsay on the Teaching of Ophthalmology to Medical Students.

The accompanying abstracts of the papers and discussions are contributed by C. Devereux Marshall (London). [C. A. W.]

The President of the Section, Dr. C. H. Usher, took the chair, and after a few words of welcome to the members and guests present, called upon Dr. E. E. Maddox to open the discussion on

"The Choice of a Cataract Operation."

He said the matter was to be considered from as many as five different points of view, each of these were of importance, though possibly not of equal importance.

First he would place safety, second the ultimate visual result, third the beauty of the eye, fourth brevity of procedure, and fifth fewness of operative interferences.

As regards safety, which was the paramount consideration, the three usual operative measures might be put in the following order (a) preliminary iridectomy, (b) combined extraction and iridectomy, (c) simple extraction.

The first of these procedures undoubtedly gave increased safety in the long run, but the method was not popular with patients, for it meant two operations and two spells of lying up, instead of one. It lessened the chances of hemorrhage into the anterior chamber. It taught the surgeon a good deal about the behaviour of the patient. It often had a good effect upon the health of the eyeball, and if the cataract was immature it might hasten its maturity. Almost the only disadvantage besides the loss of time was the presence of a cicatrix, which at the second and major operation for the extraction of the cataract, might interfere with a successful conjunctival flap. This latter disadvantage could be avoided by using a special keratome, or at any rate a very narrow one, for there was not the least necessity to make a wide incision, the iridectomy needing only to be of the smallest size. The iris should be withdrawn through this small incision with a Tyrrell's hook, or an extremely fine pair of iris forceps with the teeth on the lower edges of the blades.

Combined extraction was suitable when the loss of a few days might be of importance to a patient. In India preliminary iridectomy was impossible. The following were the disadvantages of this procedure. (1) The filling of the anterior chamber with blood from the cut iris. (8) The falling of the iris across the knife. (3) The longer time it took to complete the operation and therefore the added risk there was of the patient squeezing up the eye and endangering it.

The simple operation gave results far more perfect than any other type of operation, and were it only as safe as the two foregoing methods it would be the operation of election, and indeed the sole form of operation practiced. It was, however, never quite free from the danger of prolapse of the iris after the extraction, but this accident was much lessened by the use of sutures to fasten down the conjunctival flap. Desmarres bridge operation was even better still as a safeguard. Peripheral iridectomy or iridotomy did not appeal to him as satisfactory. After a simple extraction he was accustomed to use pilocarpin. The chief advantages of this mode of operation were (1) the visual benefit with or without glasses which was far better than when a coloboma was present, (2) the adaptation of the pupil to light, (3) the beauty of the result, and lastly the lesser chance of capsule being impacted in the wound. Its disadvantages were (1) the risk of prolapse, (2) the imperfect evacuation of the cortex, (3) the large incision required, (4) the risk of contamination of the iris during its temporary extrusion from within the eyeball.

As regards the order of safety of the common forms of incision, he concluded it ran as follows (1) subconjunctival, (2) with conjunctival flap, (3) limbal, (4) intracorneal. A corneo-scleral flap had the following advantages: (1) it bound up the wound as though by the application of adhesive plaster, (2) it protected the most vulnerable part of the wound from infection, (3) it put the severed cornea in immediate communication with the circulation of the eyeball, and (4) unless there were ballooning of the iris the probability of prolapse after simple extraction was lessened, and greatly so if sutures were used.

He had however entirely given up the use of sutures, and had taken to the use of the Bridge Operation introduced by Desmarres in 1851, and revived from time to time. It conferred all the benefits of sutures without having to spend the time and trouble of inserting them. The vitality of the flap was greatly increased, the nutrition of the cornea was far less impaired, and the upper lid could not engage in the incision nor disarrange the flap, while the safer and more rapid union permitted greater freedom to the patient with earlier restoration of exercise. The bridge method had two disadvantages, first the cortex could not be enucleated without some difficulty, and secondly the speculum could not be removed before the lens was extracted. Desmarres and Gluckie gave the measurements of the bridge of conjunctiva as 4 mm. wide, and about 10 mm. long, and it should be cut from the centre of the corneal flap. Maddox thought it better to cut the bridge from the more nasal portion of the corneal flap, making the temporal side of the bridge longer than the nasal. He described in detail how he manipulates the bridge in extracting the lens.

Lavage he thought most useful, but he strongly deprecated the use of India rubber tubes, first because the interior of these could never be inspected, and secondly because portions of the rubber were apt to be shed and these might be washed onto the eye. He showed an ingenious instrument for avoiding the use of tubes, the whole of which was in the surgeon's hand and the force of the stream could be modified to any degree. Whilst this instrument should always be ready, he thought that the less it were used the better.

As regards brevity of procedure, preliminary iridectomy took the first place, and as regards the fifth consideration, viz., fewness of operative interferences, the intracapsular method had no rival, as it needed neither preliminary iridectomy, nor subsequent needling, but its weakness amongst other things consisted in the fact that it was essentially a "two man" operation, and success depended upon each doing his part perfectly.

He drew attention to the disadvantages of some of the specula in use, and showed specimens of others he had introduced to diminish these poor effects.

Dr. Casey A. Wood, Chicago, thought that mature cataracts in otherwise healthy eyes did well with almost any operation. Immature cataracts in persons under 60 years of age were frequently complicated by some other diseased condition of the eye and were very likely to develop irido-cyclitis. It was desirable to give a course of salicylate and iodide previous to operating and also subsequently. If preliminary iridectomy were done he preferred to use a long narrow keratome and insert it far back.

Major W. E. McKenzie, I. M. S., said that of current operative procedures he considered preliminary iridectomy was the safest, but no two-step operation was practical in India. The native who found his sight not restored by the first operation would at once decamp. If there it were done it was necessary to do it at the time of the main operation. Again, because of the subsequent needling so often required after the ordinary extraction it was not so suitable as the intracapsular operation, and surgeons in Northern India were resorting to this method in increasing numbers.

The official figures for the Punjab and N. W. Frontier for the years 1898 and 1913, were as follows:

.	1898.	1913.
Operations	4,934	16,236
Cured (i. e., vision sufficient to get about with)	90.4%	94.86%
Relieved (i. e., some sight obtained but result bad)	3.1%	1.84%
Discharged otherwise (i. e., eyes lost or did not attain vision)	6.5%	3.3 %

In this area in the year 1898 intracapsular operations were not done, and in 1913 ninety per cent of the operations were intracapsular. Errors of technique might be let off with but slight punishment in the ordinary operation, but were apt to be severely punished in the intracapsular operation. Thus one of the fateful errors was to make too small an incision, this would be disastrous to the last degree, and the incision should be at least half the size of the cornea. The zonule of Zinn was not tough, and if difficulty was experienced in removing the lens it was due to the incision being too small. In his experience it seldom offered any appreciable resistance to the delivery of the lens. This could easily be proved when operating on the pig's eye. His own practice was to make a purely corneal incision finishing about 1.5 mm. from the upper pole of the limbus, but he did not consider this essential and it might be made further back if desired. In either case the delivery of the lens would be easy if the incision were large enough. He described in detail his particular method of cutting the flap and also the manipulation required to ensure the proper replacement of the iris. During the operation it was always dangerous to ask the patient to look down, for the vitreous would be sure to present if this were done. Bulging prominent eyes although favouring easy incision, were never good ones on account of the difficulties of the toilette. Sometimes deep set eyes were far easier to operate upon. He briefly described other operations designed for the purpose of removing the lens in its capsule. The easiest cases to extract in this way were the early immature ones, and if the incision were large enough their removal was usually attended with no difficulty.

Discussion of Dr. Maddox's paper on the extraction of cataract.

Dr. Casey Wood (Chicago) believed that in talking about operations for the removal of cataract one should have a distinct understanding of the particular form of the disease under discussion. Probably the most practical, if empirical, classification of senile cataract is a clinical one, and he suggested for the purposes of the present discussion the adoption of the following: (1) the so-called *mature* cataract, the result of a slow (almost physiological) sclerosis of the lens-mass in which the capsule is readily separated from the latter occurring in an otherwise healthy eye of a subject above 60 years of age. This class constitutes, at least for the middle states of the Union, about 40% of the whole number of senile cataracts. (2) Immature cataract of the same description that renders it impossible for the patient to follow his usual occupations; also about 40% of the total number. (3) Cataract, both mature and immature in patients between 40 and 60, about 20% of the whole number.

The first category may be dismissed with the remark that almost *any* extraction operation in them is followed by satisfactory results; they constitute the favourable and favorite class for operators of every degree of dexterity.

Because, however, of the almost uniformly good outcome of operative procedures this form of cataract furnishes little or no help towards solving the real problems of extraction. The genuine difficulties of the situation are chiefly encountered among the members of classes 2 and 3.

Cataract in patients under sixty years of age is, in the majority of instances, *secondary to intra-ocular disease*—often some "quiet" form of uveitis, a condition sometimes unrecognized by the surgeon or ignored by the patient. The operator who does not consider the possibility of such a cause of early adult cataract may find that he has embarked "on a sea of trouble," and that his operative measures really constitute a sort of traumatic uveitis that may eventually find him with a "lost" eye. Preparatory precautions, both local and general, are consequently of great importance—much more important than in cases of the purely senile type. When possible such patients should be in a hospital for a week's rigid preliminary local and systemic examination and treatment as part of the latter, if there be no contra-indication, large doses of salicylates or iodides should be given two or three days before and after the extraction. When it can be arranged a preliminary iridectomy should also be done a month before the removal of the diseased lens. This plan enables one to decide what the patient has to fear or hope when the extraction period arrives, and it affords a further chance of local and general treatment.

Mr. T. H. Bickerton, Liverpool, drew attention to the way in which surgeons varied in their practice from time to time. He himself performed the combined operation, but whenever possible he did a preliminary iridectomy.

Mr. Devereux Marshall, London, congratulated Dr. Maddox on the very exhaustive nature of his paper. He said it was interesting to see from year to year how surgeons abroad, and especially in India, were taking to Smith's operation in increasing numbers, but so far the progress it had made in England and Europe had been small. He himself usually did his operations without iridectomy, though he never hesitated to do one if the iris showed the slightest sign of prolapsing. He frequently did lavage to the anterior chamber, and never used a cystitome, for he opened the capsule when traversing the anterior chamber with the knife in making the incision. He strongly urged the advantage of early needling and usually did it within two to four weeks after the extraction, even if a case had normal vision after extraction, the capsule present might subsequently cause failure of vision and was therefore preferably needled at once.

Mr. J. Herbert Parsons, London, advocated the doing of a peripheral iridectomy and in this way he claimed that the advantages of both simple and the combined operation were obtained.

Dr. R. A. Reeve, Toronto, said he did a good many simple extractions, and freely irrigated the anterior chamber. He always used capsule forceps in preference to the cystitome. He found the results of this method so satisfactory that he had not adopted Smith's method.

Dr. Hill Griffith, Manchester, spoke strongly in favour of the combined operation.

Dr. Angus McGillivry, Dundee, spoke in favour of subconjunctival extraction, for he felt that after the operation was done the patient was quite safe. He did not like sutures, but he always did lavage and endeavoured to avoid an iridectomy where he could.

Mr. G. Montague Harston, Hong Kong, had had considerable experience with the intra-capsular method in China.

If the eye were at all soft he would not attempt it. but otherwise it gave excellent results. It was absolutely necessary that a large section should be made to include at least half the cornea and iridectomy should be done always.

Professor Harold Gifford, Omaha, thought there were many reasons why the intracapsular operation should be done in India, but he considered it unnecessary in Europe and America. He always aimed at a very thorough anaesthesia, and he obtained this by the subconjunctival injection of a 4% solution of cocaine at the upper part of the eye and over the internal rectus where he placed his fixation forceps for the purpose of counter pressure as well as for fixing the eye. If this were done four minutes before the operation the whole procedure was painless and the iris quite anaesthetic.

THURSDAY, JULY 30TH.

Mr. J. Herbert Parsons, London, opened a discussion on: **"The Hygiene of Reading and Near Vision."**

He traced the development of letters from the earliest times and showed how various modifications in letters had arisen, these were due either to desire to facilitate the ease of reading or for the purpose of beautifying the print. It was only within the last thirty years that the subject had been studied from the scientific point of view. At first letters were introduced with but little consideration of physiological requirements, but much more largely with regard to the mechanism of their production. He carefully described the way in which most of the Roman letters were made up and developed. Adolph Weber had investigated the rapidity of reading with types of different sizes, and found that if letters were more than 2 mm. in height the rate of reading diminished, and the best height was 1.5 mm. He then discussed the effect of interlineation, and the distance between letters and words and letters. The tendency of modern books was to reduce the length of lines. Cohn gave 90 mm. as the ideal length, 100 mm. as the maximum, and 30 mm. as the minimum. Williamson of Manchester found that of 250 school books the type was equal to a larger than Cohn's standard in 109. In 111 or 44% the type was too small. He also drew attention to the relationship of illumination to near work. Roughly speaking the minimum illumination of the type which permitted of normal visual acuity with Snellen's test types was between 2- and 3-metre candles. Vision improved up to 10-meter candles, after which it remained almost constant up to 30-metre candles and over. A glare had less effect in diminishing visual acuity than was generally supposed to be the case, but there was no doubt it was distressing and should be avoided. A Committee of the Illuminating Engineering Society had reported that the minimum illumination measured at any desk should not fall below 2-foot candles, but for special work, such as drawing, sewing, etc., as much as 4-foot candles was desirable. For assembly rooms and general illumination a minimum of 5-foot candles was recommended on a horizontal plane 3′ 3″ from the ground level.

Dr. Angus McGillivry, Dundee, thought there was a tendency at the present time to run riot on this subject. He had never seen organic trouble produced by the wearing of improper glasses.

Dr. F. W. Edridge-Green, London, said that some physiological facts had an important bearing on the subject and the explanation was that the centre of the retina was sensitized from the peripheral parts and it was therefore necessary that the whole retina should be illuminated. Many persons who suffered headaches after reading with a reading lamp in an otherwise dark room, or playing cards with a light over the table lost their headaches when the whole room was lighted up.

Mr. L. A. Parry, Hove, called attention to the large number of rooms in elementary schools which were improperly lighted. The whole or main source of light should come from the left. In most schools badly printed books had been abolished and also fine sewing for young children.

Dr. R. A. Reeve, Toronto, spoke against the use of highly glazed paper, especially in books intended for the use of children.

Mr. Devereux Marshall, London, said he had frequently heard people complain of electric light being tiring to the eyes. He thought that it had most of the essentials required for good lighting. It was steady, and could be arranged to be of any desired brightness. He thought, however, that people used their eyes far more now electric light was in common use than they did before when they had the trouble of lighting a lamp and so really the eyes were far more severely used. He spoke of the serious results produced by the looking into the sun or into the electric arc without proper protection, both on the retina and also on the cornea and conjunctiva.

Dr. Casey A. Wood, Chicago, spoke of the various suitable and unsuitable papers which were used for books and defended the glazed variety as the only suitable one for the production of half-tone and other illustrations.

Dr. A. J. Ballantyne, Glasgow, said that in view of a general opinion that actual organic harm might result from glare and badly illuminated school rooms, the greatest caution should be exercised that no loose statements to this effect should be made which could not be proved. We might get claims made by workmen founded on such statements. A sound scientific knowledge should be arrived at which could be used as a basis on which to work.

Dr. Marion Gilchrist, Glasgow, said that the eyes of children were taken far more care of than formerly, she was of opinion that badly fitting spectacles were most harmful.

Dr. Montague Harston, Hong Kong, thought that the more the subject was ventilated the better. In the tropics electric light was often used all day on account of the necessity of drawing blinds to keep out the sun. Many people employed in decoding messages sent by cable had the most trying work to do as regards their sight.

Mr. Parsons in reply, said that he considered the subject of the greatest importance, and Dr. Edridge-Green had opened up a very important point. He thought that electric light was responsible for a great deal of discomfort to the eyes, and it was a fact that all the recent illuminants made use of the violet end of the spectrum far more than the red end as was illustrated by metallic filament lamps and incandescent gas mantles.

A Discussion on the Teaching of Ophthalmoscopy to Medical Students was opened by Dr. A. Maitland Ramsay, Glasgow.

Dr. Ramsay said that in the Scottish medical schools the teaching of ophthalmology was compulsory, but the number of hours devoted to it was entirely inadequate, and with the exception of the University of St. Andrews no examination in the subject was held. Very occasionally an eye question was set in the medical or surgical papers, but the lecturers in ophthalmology took no part in the examination. This contrasted badly with the arrangement in Ireland, continental Europe, and many of the schools in America, in which it formed an important part of the final examinations. So many subjects were compulsory that unless an examination was held on a particular subject but little work would be done by the students in that subject. Ophthalmology should not be looked upon as a special subject but should form an integral part of medicine and surgery. The country practitioner would frequently be called upon to treat eye cases, and some guarantee was necessary that they would be capable of recognising the ordinary eye diseases. The aim of teaching should be to put the student in the possession of these essential facts. He should be taught how to conduct an examination on so important an organ as the eye. He should know how to investigate a refraction case even if he did not know much about the treatment of it.

Mr. M. L. Hepburn, London, detailed the methods adopted for teaching students at Moorfields. He deprecated set lectures, but strongly advocated practical clinical instruction.

Miss E. M. Maxwell, Dublin, stated what was the practice in Trinity College.

Mr. Montague Harston, Hong Kong, said that the new university in that place had appointed him to be professor of ophthalmology, and much attention was paid to the subject.

Mr. Hill Griffith, Manchester; Mr. A. F. MacCallan, Egypt; Dr. R. A. Reeves, Toronto; Dr. Casey Wood, Chicago; and Mr. Herbert Parsons, London, all spoke to the various practices of the universities and colleges with which they were connected.

Mr. T. H. Bickerton, Liverpool, proposed the following resolution:

"That the members of the Section of Ophthalmology recommend to the Council of the B. M. A. that not only should a course of ophthalmology be compulsory, but that every student should pass an examination in the subject before he obtains his qualification to practice." This was seconded by Dr. McGillivry, and carried unanimously.

Dr. Ramsay gave a demonstration with the epidiascope of coloured photographs showing certain eye diseases.

FRIDAY, JULY 31ST, 1914.

Dr. A. Hill Griffith, Manchester, read a short paper on "A Case of Late Infection following Elliot's Operation for Glaucoma." He said he did his first trephining for primary glaucoma in January, 1911, and had done in all 125 cases, besides a good many for secondary glaucoma and for other diseases. He was well pleased with the results of the operation. He, however, had had the case of a man aged 55 years on whom he did the operation for chronic glaucoma in both eyes. The vision in both eyes was 6/18 and they were both in about the same state of the disease. Both were operated upon. A year later the patient was seen with purulent iridocyclitis in the left eye with Tension —3, exudation in the pupil and severe injection. The eye was removed three days later. The attack had commenced four days before he had come up for examination. The right eye was satisfactory in every way. He had found 30 recorded cases including his own of such late infections, but he thought this must represent only a very small proportion of the total number of eyes operated upon. His confidence in the operation had been shaken and he felt it his duty to publish the case.

Mr. Devereux Marshall, London, thought that all eyes in which there existed a cystoid scar were liable to develop iridocyclitis from slight conjunctival infections. He mentioned a case of a lady who was operated upon for double glaucoma in 1887. Iridectomy was done and the case did well. A year later, however, a catarrhal conjunctivitis developed and one eye was lost in exactly the same way as in Dr. Hill Griffith's case.

Professor H. Gifford, Omaha, quite agreed that all cases in which the fistula existed were dangerous, and as a precaution against conjunctival infection he made it a routine practice to insist on such patients washing out the eye once or twice a day with an antiseptic solution.

Mr. J. Herbert Parsons, London, was surprised that late infections did not occur more frequently than they did. He advocated a very large conjunctival flap and the trephining well forward into the cornea as described by Elliot.

Mr. Montague Harston, Hongkong, advised the careful examination of all accessory sinuses in these cases for fear of a latent infection therein.

Dr. A. J. Ballantyne, Glasgow, thought the conjunctival flap should be cut as thick as possible.

Dr. Casey A. Wood, Chicago, had seen two cases of infection after trephining. One occurred three weeks after the operation and the other six months after.

Dr. A. Maitland Ramsay, Glasgow, thought it most important not to cut the conjunctival flap down to the periphery at its extremities.

Dr. James A. Wilson, Glasgow, thought a thin flap was always dangerous, it should be cut as thick as possible.

Mr. T. H. Bickerton, Liverpool, and the President both said that they had seen no case of late infection following trephining. Mr. Hill Griffiths replied that infection did not come about from the extremities of the flap, but through the bleb over the trephine opening itself.

Dr. F. W. Edridge-Green, London, read a paper on "An Analysis of the Results of the New Sight Tests of the Board of Trade." He took the published reports of the Board of Trade and carefully drew attention to the facts these brought out. The tests now in use consist of an improved wool test in which five test colours were used, and also a special lantern introduced by the Board of Trade. Of the 286 definite rejections in the local examinations 148 failed in both the lantern and wool test, and 138 failed in the lantern test only; there was no failure with the wool test which passed the lantern. Of the 286 failures 93 appealed, 26 successfully. Of 125 referred cases, 20 were referred on both the lantern and the wool tests, and one on form vision as well. Of this number there were 30 failures, 3 of these were referred on both lantern and wool test, 26 on the lantern only, and one on form vision as well. Those referred on the wool test only were passed. These figures did not quite agree with those in the report which was inaccurate. The results were not tabulated so that it made it quite difficult to arrive at these figures. If they were it would settle once for all the question of the efficiency of the wool test even in its improved form. There was no failure with the wool test which passed the lantern. 52 % of the rejected candidates were able to pass this wool test. The wool test as now used was infinitely superior to the form as originally advocated by Holmgren, and yet even so this huge percentage of dangerous cases were able to pass it. He then adversely criticised the lantern as used by the Board of Trade, and pointed out that it almost exactly resembled a discarded pattern of his own.

Mr. J. Herbert Parsons, London, defended the Board of Trade tests, but admitted the subject was a very difficult one.

Mr. Devereux Marshall, London, commented on the inadequacy of the Board of Trade tests and the very bad results they got by their own showing. He was glad that Mr. Parsons thought the subject a difficult one, and it is therefore the more incomprehensible that the Board of Trade should justify the employment of ignorant examiners who admittedly knew nothing about eyesight or of eye tests. Under these circumstances he was not surprised to see the bad results recorded officially in this report.

Major McKechnie, I. M. S., said that in his opinion the Edridge-Green lantern was the most scientific and the best test there was for colour vision. If the lantern detected all the dangerous cases, and the wools only a few of them, he could see not the smallest justification for the retention of the wool test at all. He thought that a definite standard should be settled upon, and that possibly the Admiralty could help in this respect.

Dr. Edridge-Green replied.

Dr. James A. Wilson, Glasgow, read a paper on "The Factor of Heredity in Myopia." On the evidence of 1,500 cases he concluded that there was a hereditary factor in no less than 58%. As evidence of hereditary myopia he took the fact of myopia in one parent or brother or sister. Or "statements that a parent or relative could see to read, write or sew without glasses at or over 60 years; habitually passed friends in the street, yet had good near vision; glasses were removed for reading; when reading held paper close to the face." In children he found the sexes unequally affected, the difference increased with age, giving a ratio of two females to one male; a ratio suggesting sex limitation. The incidence of myopia bears a direct relationship to the amount in the parentage or extraction, and there is order in the transmission. There is similar evidence of heredity in high degrees and in low degrees of myopia. No special association with occupation was found, and the innate character indicated independence of environment.

Mr. Bishop Harman, London, presented a paper on "The Causes of Blindness in 1,100 Children; with Special Reference to the Influence of Venereal Disease."

These children he has seen over a period of ten years, and all of them had been examined many times, in most cases their parents had been seen also, there was therefore exceptional facility for making accurate diagnoses of the original cause of the blindness. Of the 1,100 children no fewer than 58% owed their pitiable condition to affections produced by venereal disease. Of the total 24% were blinded by ophthalmia neonatorum, the remaining 34% (with an exception to be noted) were blind or partly blind from conditions directly produced by or associated with inherited syphilis. The exceptions were two cases of children who had lost their sight from gonorrhoeal conjunctivitis contracted from infants affected with ophthalmia neonatorum. In the syphilitic groups it was of interest to note that children suffering from interstitial keratitis presented positive evidence of syphilis as the primary factor in no less than 90%. The positive percentage was less in the inflammatory states within the globe, such as disseminated choroiditis, but in these there was an unusually high incidence of mental defect of serious order, often amounting to insanity.

The high incidence of venereal disease as the primary cause of blindness in children was an indication for activity in checking the spread of and for effective treatment of the diseases.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

FEBRUARY 3, 1914.

DR. WILLIAM ZENTMAYER, CHAIRMAN.

Case of Glaucoma operated on by the Elliot Method.

Dr. P. N. K. Schwenk said that the case he desired to show was the most successful case of Elliot Operation that had come under his observation, done by himself, out of seven cases. One case he wanted to report was operated on by Col. Elliot himself and last week it was found necessary to remove the eye on which the Elliot operation had been done. Dr. Schwenk could not relieve her of pain and the eye went from bad to worse and to save her from further suffering he advised enucleation. She had an aortic murmur and a blood pressure of 200 mm. Hg. This was the first time he had been called upon to remove an eye after the Elliot Operation. In his estimation the Elliot Operation should only be done on chronic glaucomatous eyes; not on any eye where there was a tendency to inflammation.

Hyperphoria Following Frontal Sinus Operation.

Dr. Schwenk showed a case which had been operated on for frontal sinusitis on February 7, 1911. After the operation the patient had a right hyperphoria of 8° with vision 6/15; with correction today the right eye=6/6 and the left eye=6/6. With the hyperphoria corrected the upper lid movement was somewhat limited.

Foreign Body Perforating the Globe.

Dr. Schwenk showed a case of a gun-shot wound in the right eye. The shot passed through the ball and was localized just about 10 mm. outside of the optic nerve. Vision today was 6/6.

Contracted Socket.

Dr. Zentmayer showed a case which was operated on by the Maxwell method two weeks ago tomorrow. The patient had this eye enucleated ten years ago and was wearing an artificial eye until one year ago; then the socket contracted and forced the eye out and she was no longer able to wear it. and without the artificial eye it became irritated. The Maxwell operation was performed and it was very interesting to compare it with Dr. Ziegler's result. The shell was in but it was not fair to judge the result with this shell because the socket was deep and forced the artificial eye upwards and backwards as there was no sulcus above. Dr. Zentmayer pointed out the depth of the sulcus. This was such an unusual operation that Dr. Zentmayer showed the procedure on the blackboard. An incision of 5 mm. was first made inside the orbit behind the margin of the lid; then the incision was deepened and carried behind the lower lid so as to get the required depth to the cul-de-sac. An incision was then made outside the lid, on the cheek about 5 mm. from the border of the lid. These two were connected with another incision which included a space of skin of about 12 mm. The third step was to free this flap except for the central area which is left attached. The next step was to connect the upper incision with the orbital incision. Pass sutures through each horn of the crescentic piece of skin, slip them through the tunnel and bring them out into the orbit and attach to the angles of the orbital incision. The piece of skin on the cheek becomes the floor of the cul-de-sac.

Case of Glaucoma.

Dr. Zentmayer showed a most unusual case of Congenital Glaucoma with marked distention of the globe. The patient had been fortunate enough to retain vision up to this age; he was now forty-seven; which was certainly very unusual. The left eye was lost by the same process and the right had been rapidly going the past year. He had a tension of over 100 mm. and was maintained at 90 mm. notwithstanding rest in bed and and careful use of Pilocarpin and subconjunctival injections of Sodium Citrate. The Sodium Citrate seemed to lower the tension temporarily. It got as low as 60 but this was right after the injections and it always returned to 90 or more. With this he had congestive attacks and found difficulty in getting about. Central vision was 20/40 with his correction, which was aphakial, the lens having been dislocated into the vitreous and become absorbed. He was kept in the hospital for two months, but as at the end of this time he was not willing to accept the advice of operation he went home and his vision continued to fail. He came down three weeks ago and an Elliot Operation was performed. It was especially difficult to take hold of the iris with the iris forceps as it would slip back on each attempt. The pupillary margin of the iris was finally seized with a blunt hook and dragged out and snipped off by the assistant. The tension was then 12 and he had had no congestive attack since the operation.

Xerosis of the Cornea and Conjunctiva.

Dr. Picard showed a colored woman thirty-six years old and one of eight children. She was the only one afflicted with Xerosis. It began eight years ago with dryness of conjunctivae and dryness of the lids. This was followed by loss of cilia, and followed later by complete alopecia of the head, and later of loss of hair over various parts of the body.

At the present time there was entire loss of tears with blocking up of the canaliculi, the cornea was insensitive and there was complete loss of vision. Both corneæ were covered with an epithelial growth. There was loss of the cul-de-sac, while both lids could be closed.

This condition appearing in children is known as Keratomalacia and is fatal, free pus developing in the cornea and death resulting from complications; pneumonia and septicemia.

Nothing has been proven of the germ theory in this condition and taking into consideration the various affections of the skin in different parts of the body Dr. Picard was inclined to view this as a manifestation of a central lesion.

Cataract from Electric Shock.

Dr. Posey showed a case of cataract in each eye in a man 33 years of age, following an electric shock. Loss of sight ensued about three months after the injury, which was occasioned by the patient's head coming in contact with a live wire. The strength of the current was said to be 4,400 volts In addition to the ocular lesions, the injury had entailed severe burns of the right frontal region, of the right shoulder and left arm. The loss of vision, which had appeared first in the right eye and in the left eye some months later, had progressed so far that at admission vision in O. D. equaled light perception only, in O. S. 4/60. Examination revealed extreme scarring about the right eye, with some ectropion of the upper lid, but no damage to the ocular structure beyond the lenticular changes. These consisted of an irregular central anterior opacity about 1 x 2 mm. in size and of a grayish white color, and of a general diffuse haze of the entire anterior portion of the lens, made up apparently of numerous minute opaque globules. Combined extraction of the right lens and subsequent needling was accomplished with resultant corrected vision of 5/20, illiterate. No ophthalmoscopic changes were evident in either fundus. Dr. Posey referred to a recent paper of Lauder of Cleveland, who had reported a similar case and referred to several other cases in literature.

Orbital Abscess from Maxillary Sinus Disease.

Dr. Posey showed a case of orbital abscess from disease of the superior maxillary in a child five years old, from his service at the Children's Hospital. He referred to a previous report of two cases of this condition by him before the Ophthalmic Section of the A. M. A. in 1912. According to Dr. Posey the disease of the bone frequently arises from the alveolar border, but at other times the antral cavity is at fault. Proptosis is usually marked and unless free drainage is established the eye may be lost from panophthalmitis. He spoke at length upon the development of the antrum and referred to Onodi's illustrations to demonstrate the points which he raised.

Congenital Cataracts with Dislocation of the Lens.

Dr. Posey showed a second case from his service at the Children's Hospital of zonular cataracts in each eye, conjoined with an upward and inward dislocation of the left lens. He had recently needled the right lens, with resultant absorption of lens matter.

Dr. Zentmayer discussing Dr. Posey's case said that such cases either start with a purulent inflammation of the maxillary sinus or a periostitis of the maxillary bone. In recent work it has been shown that the sinuses develop much earlier than was formerly supposed so that we may consider an inflammation of the sinuses as an etiological factor in these early cases. While he had never had a case of this kind he had frequently seen the sequel in an ectropion from an adherent scar at the lower orbital margin.

Exophthalmus.

Dr. Fisher reported the following case: "Eight or nine days ago this boy, aged 11, came to the Hospital showing marked proptosis, left eye interfering with action of the muscles, both of the lids and eyeball. A hard mass filled the orbit and protruded, a lobulated border extending ¼ to ½ inch over the lower margin of the orbit. History of six weeks development without pain and previous diagnosis of possible cancer was obtained. The nerve head was hyperemic and there was pronounced reduction in the size of the arteries. Vision 6/15. That of the right 6/6. Consent of the father was obtained for the removal of the eye if found necessary. One week ago he was prepared for operation but finding the proptosis much less, ocular motion restored and recession of the mass to within the orbit proper, interference was deferred. By advice of Drs. Posey and Zentmayer the boy was put to bed under the alternating application of ice compresses and pressure bandage and has progressed to the present satisfactory condition. The mass however can still be found on inner half of the floor of the orbit. The case is presented as being possibly due to sinus trouble. X-ray was made and it was thought that there was distinct shadow. Another plate will be made for comparison.

In his discussion of Dr. Fisher's case, Dr. Posey said that when he had first seen Dr. Fisher's case, he had been led to make a diagnosis of orbital cellulitis from antral disease, even though no positive signs of inflammation of that cavity were present at the time. In his experience, fully nine-tenths of all cases of cellulitis are secondary to sinus affections; the orbit being a closed cavity, inflammation frequently persists after the drainage from the sinuses had permitted all inflammatory signs to disappear from these cavities. On account of the danger of optic neuritis and possible atrophy from inflammation, arising from continuity of tissue, he had counseled incision to relieve the proptosis occasioned by the cellulitis. He had never before seen such a rapid subsidence of an orbital cellulitis without operative treatment.

J. Milton, Griscom, M. D., *Secretary.*

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Regular Meeting, Tuesday, April 7, 1914.

Plastic Operation for Cicatricial Ectropion of the Lower Lid.

Dr. P. N. K. Schwenk exhibited a boy who, when quite a child, had an abscess of the orbit, producing a contraction of the lower lid—a condition of so-called ectropion. He was not able to close the eye completely, and the eye-ball was thus exposed to irritation; so the idea of doing a plastic operation was conceived. The question then arose as to the choice of a place from which to take the flap. The first thing to get rid of was the cicatrix, which fastened the cartilage of the lower lid to the lower rim of the orbit. It was necessary to cut out all of the cicatrix, merely saving the ciliary border of the lid. An incision was then made directly out from the external canthus, sickle-shaped; so that the curve of the flap would fit into the curve of the lower lid. Of course, it was necessary to turn the flap; and doing this made quite a fold of tissue. The size of the flap in such cases should be thirty-three per cent. larger than the denuded area, or even twice as large, to allow for shrinkage.

After the part had been denuded, and the flap placed in position, the edges were united with a number of sutures, and the flap brought into position. The denuded part on the temple was then undermined, and the surfaces brought together. This produced some tension.

The lesson to be learned from this operation is, in the first place, that the conjunctiva was not loosened deeply enough in the orbit; because some contraction has taken place, which has pulled back the lid, although not quite to the same extent as it was before. Dr. Schwenk believed that the operation would have been more successful, had he cut the external ligament and sutured the lid to the brow, so as to hold up the lower lid until union took place. Another time, he will unite the flap to the lid by stitches passing through the skin and the conjunctiva, so as to keep the surfaces in direct apposition.

The operation was done on the 17th of March, and the patient got home-sick and left the hospital too soon; so that continuous pressure was taken off. This should be maintained until after the stitches are removed, at least. A correction can be made after contraction has taken place. It is astonishing how much these grafts or flaps contract after operation.

While complimenting Dr. Schwenk on the excellent results obtained from his procedure, Dr. Posey thought that scarring would have been less, had the usual method applicable to such cases been followed, and had the flap been taken from the temple and from above the brow. The resultant scar tissue then follows the natural lines of the face, and is often scarcely noticeable.

Dr. Zentmayer asked Dr. Schwenk to describe the details of the after-treatment. Some surgeons feel that the after-result is largely dependent on the way in which the cases are dressed, the subsequent applications, and the time of removing the sutures. Steps of that kind are of the utmost importance.

Dr. Schwenk thought the after-treatment a very important question, and believed that in this case the result would have been better had he been able to keep the boy in the hospital longer and continue the dressing as he had dressed it. He did not think anything better for this purpose than cosmoline or albolene, and pressure. If there are any sore spots, he advocated using boroglyceride, applied to the denuded parts; but the continued application of cosmoline with pressure is simple, and nothing is equal to it. Cosmoline is an antiseptic; so that we can, without removing the stitches and the pressure, keep the flap in apposition, which is a very important thing.

Melanosarcoma of the Conjunctiva.

Dr. H. M. Becker stated that the boy exhibited by him was one whose history, obtained from his mother, contained the statement that when born, he had a black speck on the conjunctiva, which persisted and gradually enlarged. It was permitted to run along until he was twelve years old, one year ago. He is thirteen now. At that time, on making an examination of the eye, a black pigment-growth on the conjunctiva, towards the inner canthus of the right eye, was found. It was freely movable, and did not seem to be adherent to the sclera. There was a bunching of the pigment over the edge of the cornea, with a sort of cystic appearance; but it did not appear to be a true cyst. It seemed to be more of a thickening of the episcleral and conjunctival structures.

Two rather long incisions in the conjunctiva were made; one, upward; and the other, downward. These incisions were made at an angle of almost sixty degrees from the horizontal, the apex being at the limbus. Under local anesthesia, a dissection was made all the way back under the caruncle; and there is now very little retraction. It was thought that the growth had been completely removed, and the pathologist reported it to be a melanosarcoma.

About four or five months following the operation, there was a recurrence of a little pigment-deposit at the limbus; and about eight months after the operation, there was a small deposit, the size of a millet seed, which can be seen one-quarter of an inch downward and inward from the limbus. Dr. Becker brought the patient before the society, in order to get an opinion as to whether this is the recurrence of a malignant growth or of a nonmalignant growth. The pathologist reported a mixture of large and small round cells, but no giant cells. The blood-vessels are rather large, and have not well-formed walls. He did not commit himself positively, but said that the growth was probably a melanosarcoma.

Dr. Schwenk was reminded of a case that he had seen in 1891. The growth was removed, and found to be a dense melanosarcoma. The case remained in *statu quo* until 1901, when recurrent attacks came on quite frequently. The best results obtained were from the application of monochloracetic acid. Dr. Schwenk believed that it is dangerous to cut these cases, and prophesied enucleation for this ball, if repeated cutting should be done. The case that he had under observation was enucleated in 1911, having been under observation for twenty years. It was questioned by Dr. Oliver whether it was a sarcomatous growth until the final result. Dr. Schwenk cautioned Dr. Becker that the less cutting done, the less recurrence would there be. He believed that there were tissues beyond the point of pigmentation containing sarcomatous cells that would become active, sooner or later, although then in embryonic form; and that these would cause recurrent attacks.

Monocular Retrobulbar Neuritis from Ethmoiditis.

Dr. Posey referred to a case of monocular retrobulbar neuritis from ethmoiditis, under his care at the present time, in which vision was improved from 2/60 to normal after a week's treatment, directed to the underlying basal condition. He referred to Onodi's work in showing the connection between the sinuses and the optic nerve, and pointed out how the nerve might be just as readily affected in disease of the posterior ethmoidal cells as in sphenoiditis.

Congenital Atresia of the Lachrymal Duct.

Dr. Posey exhibited a case of congenital atresia of the lachrymal apparatus, in a young man in whom he had established lachrymal passages by the insertion of styles. Eighteen months had elapsed since the operation. The passage on the right side was quite patulous, the style having been removed a year previously. The style was still *in situ* on the left side, and was occasioning some little irritation and would have to be removed.

Complicated Cataract.

Dr. Posey showed a young woman with complicated cataract in the left eye, the opacity being secondary to uveal disease, the precise nature of which had not yet been determined: but it was probably due to intestinal intoxication.

Hemorrhagic Glaucoma.

Dr. Posey also exhibited a woman with hemorrhagic glaucoma in the right eye and a deep glaucoma-cup in the left eye, which had been treated with atropine by a general practitioner, notwithstanding the stony hardness of the eyeball and the presence of blood in the anterior chamber. Dr. Posey would rely upon miotics to control the disease, and deprecated any form of operation in glaucoma with hemorrhages.

Complete Sclerosis of the Retinal Circulation.

Dr. William Zentmayer gave the notes of a case in which this condition was present, and showed a water-color reproduction of the fundus.

O. B., male, aged thirty years, a driver, in the last stages of chronic interstitial nephritis, came to Wills Hospital on March 10, 1914, complaining of failing vision in the left eye. This had come on three days before. He stated that the vision of the right eye had been lost some time between the ages of five and ten years. He had a primary sore, with marked secondaries, in 1909. He has been married about a year and a half, and has a healthy child, ten months old. The urinalysis showed a specific gravity of 1012, four per cent. of albumin, and numerous granular casts.

An ophthalmoscopic examination showed, in the right eye, a secondary posterior cortical cataract, somewhat obscuring the fundus. The papilla appears unusually large, chalky white, and filled in. The retinal vessels are converted into dead-white ribbons, tapering towards the periphery of the fundus. Only the main branches are visible, and these do not extend so far out on the retina as normally. Upon the papilla, a hair-line red reflex can be made out, with difficulty, in two of the branches. There are no other lesions in the fundus. The left eye presents the picture of a typical albuminuric neuroretinitis. There are numerous hemorrhages, white plaques, and marked papilledema.

While similar changes are not uncommon in sections of a vessel, or perhaps an entire branch, such complete obliterative endarteritis and perivasculitis is very rare. The cause is probably an obstruction to the central artery of the retina or syphilis.

A Case of Reversion to the Negro Type.

Dr. Frank Fisher presented a bright mulatto girl, nine years of age, exhibiting an irregularly egg-shaped area of absolutely black tissue, about 1½x2½ inches in size, extending from the outer canthus of the left eye, directly downward. The edge of each lid is also deeply pigmented, and this pigmentation extends for a quarter of an inch into the tarsal conjunctiva of each lid. The area on the cheek is very slightly elevated, and almost covered with a growth of very fine, very short, straight, black hair.

Dr. Fisher considered it a reversion to the original type. The changes were very peculiar, and he thought that the fact of its having a hairy growth on it was a pure coincidence. The possibility of bleaching it by means of carbon dioxide had been suggested, and Dr. Fisher thought that Dr. Picard would probably try that treatment.

Dr. Chance was inclined to regard it as a nevoid growth, as the sensation and touch were entirely different from that experienced in touching pigmented anomalies. A simple reversion would not necessarily be followed by such hairs as grow there, whereas melanotic or nevoid cases are frequently hairy.

Dr. Picard said that the cases which he had seen were rarely in colored persons. He agreed with Dr. Chance that it was a little thicker than a nevus; but said that very frequently the capillary dilatation and engorgement are responsible for that.

Dr. Ziegler suggested that fulguration might be of service in such a condition.

A Capsulo-Muscular Advancement Operation.

Dr. Ziegler showed a case of advancement, which he called a capsulo-muscular advancement, with a partial resection of the muscle. He exhibited the case to show the final result, because the patient would soon leave the hospital. The muscles were in a straight line, and the muscular action was very good. Dr. Ziegler showed two drawings, which partially illustrated the operation.

There are practically three stages to the operation. The first is the insertion of the anchoring suture in the muscle; the second is the passing back of the suture through the capsule; and the third is anchoring to the sclera in front.

Dr. Posey had done two of these operations: one, alone; and one, with the aid of Dr. Ziegler. He was very well satisfied with the result, particularly in the case in which Dr. Ziegler helped. The result, however, was excellent in both cases. Dr. Posey considered it a very good and safe procedure.

Bilateral Optic Neuritis Due to Ethmoid Infection.

Dr. Heed recorded the case of a female aged thirty-nine years, seen in October, 1913, when she had complained of blurred vision and vertigo. The ophthalmoscope disclosed a suspicious hyperemia of each disk. One week later, the hyperemia was pronounced; but no other ocular signs of disease were elicited. The fields were normal. Vision in the right eye was 6/4; in the left, 6/6. The case was referred, for examination of the accessory sinuses, to Dr. L. J. Burns. Five days later, the fundus picture presented a circumscribed neuritis with engorgement of the retinal veins; but no other peripheral changes were noted. The fields showed a contraction of thirty degrees, temporal; ten degrees, upper and lower; and five degrees, nasal. The contraction was practically the same in both eyes. There was a relative central scotoma of the left eye. Urinalysis and the Wassermann test were negative. Dr. Burns reported posterior ethmoid infection. The patient was admitted to the Polyclinic Hospital for active treatment. Upon her discharge, ten days later, the fields showed a very decided improvement. The vision in the right eye was 6/5; in the left, 6/10.

The case illustrates the importance of repeated perimetric tests in accessory-sinus infections.

Dr. Ziegler had seen a number of cases of monocular optic neuritis following ethmoiditis, but had never seen a double case; and for this reason, he thought that Dr. Heed's case was exceptional.

J. MILTON GRISCOM, M. D., Secretary.

ROYAL SOCIETY OF MEDICINE. — SECTION OF OPHTHALMOLOGY.

The usual meeting of the Section was held on Wednesday, May 6th, under the presidency of Sir Anderson Critchett, Bt. C. V. O.

Mr. Basil Lang showed a stereoscopic X-ray photograph of a case of traumatic enophthalmos also a bottle specimen showing an early stage in intra-ocular suppuration.

Mr. Booklis showed a congenital cataract, probably of the Coppoc type.

Mr. R. Affleck Greeves read a paper entitled "Pathological Observations on the Filtration Angle in some Glaucoma cases." He spoke of cases of glaucoma in which there was no closure of the filtration angle by a peripheral anterior synechia. The cases described in the paper resolved themselves into three groups. In the first were those in which an irido-cyclitis was, or had been, present. He described the invasion of the spaces of Fontana by granulation tissue containing capillary vessels, this tissue ultimately forming a solid mass of scar tissue, with which the pectinate ligament became incorporated. In the second group, the tissues of the pectinate ligament were unaltered, but the spaces were blocked by large swollen cells, apparently of a phagocytic nature. In the third group the spaces of Fontana were open, but simple retinal detachment was present. In these latter cases the author suggested the rise of tension and the retinal detachment were due to the same cause, namely, an alteration in the composition of the intraocular fluid. Mr. Greeves also commented on secondary glaucoma with intraocular growth, and said he thought that in some cases an inflammatory element might be present. The contribution was illustrated with micro-photographs, shown by means of the epidiascope.

Lieut-Col. Herbert, I. M. S., read a paper on "The Ideal Glaucoma Incision." He said the section most suitable for the relief of glaucoma was a limited sub-conjunctival incision in the transverse vertical plane, a millimetre behind the limbus, the conjunctiva at this point being only loosely attached. A sufficiently near approach to this section could be obtained by puncture and counter-puncture with a very narrow tapering knife. Though sufficiently peripheral superficially to facilitate diffusion of aqueous backward under the conjunctiva, it reached the deep surface of the cornea well in front of the root of the iris. Although making only a limited opening into the anterior chamber, the incision was superficially long, so widening the area of diffusion. Thus the tendency to localized vesicular change from filtration through the conjunctiva was reduced to a minimum. It was this change which had been mainly responsible for the late infections reported after trephining. Permanent filtration through this incision was secured, in chronic glaucoma if the wound were kept open 24 hours. One method of doing this was to fix a gilded rod of metal by sutures so that it lay in the incision though upon the conjunctiva, depressing the latter into the scleral groove The method possessed the great advantage of never emptying the anterior chamber, and during the operation there was only slight leakage. The operation, therefore, seemed to be one of the safest imaginable. Apart from the feature of reducing the danger of late infection, the risk of intra-ocular hemorrhage was lessened, and interference was reduced to the minimum. Ordinarily, there was no need to interfere with the iris in any way. The details, however, required yet to be more fully worked out. It was necessary (1) to avoid unnecessary displacement of the conjunctiva, which tended to localize filtration, and (2) to provide sufficiently free leakage of aqueous in congestive and absolute glaucomas.

Mr. N. Bishop Harman made a communication on "A variable flap operation for chronic glaucoma." He devised the operation for the purpose of allowing the surgeon some latitude in the grading of the effects intended to be produced. Most of the methods now used were very rigid—the same sort of thing was done for every sort of eye and every texture of sclera, whether thin and soft, or hard and tough to the point of being gristly. After an initial scleral section with the keratome, the modified twin scissors devised by the author were used to cut a corneo-scleral flap. The blades of these scissors had been so modified that they cut a U-shaped piece free, except for a narrow stalk of attachment to the cornea. This flap was freely movable; the ordinary tension of the eye lifted it above the general level of the sclera. It was so mobile that it could be twisted over on itself; then it was found to lift the conjunctiva, and form a sort of inclusion tissue keeping open the scleral fistula. If the sclera were unusually tough, the flap could be removed with the touch of a knife. He favored the operation as securing the desired variation, and the twisting of the flap in particular promised to be very effective.

Mr. W. G. Laws read a paper entitled "Herbert's small-flap operation for glaucoma." He said he was inclined to return to the original type of the operation, and make lateral cuts with the knife, for scissors must crush and injure the tissues before dividing them, and in glaucomatous eyes tissues already lowered in vitality were being dealt with. For that reason he did not apply antiseptics to the conjunctival sac; he did not even douche it before operating; he simply cleansed the edges of the lids with 1 in 3,000 perchloride. Out of 140 cases, he had had intra-ocular hemorrhage in only three at the time of the operation. These three he detailed. He would not apply one form of operation in all glaucoma cases indiscriminately. He preferred to do the open-wedge operation in long-standing glaucoma cases, particularly when the angle of the anterior chamber was shallow.

Mr. A. L. Whitehead (Leeds) pointed out that after the glaucoma operation, fistulous tracts were set up from the anterior chamber towards the spaces of Fontana, lined with epithelium which was probably derived from that in the anterior chamber. When failure occurred from the operation, it seemed to be due to a fibrous tissue formation, which closed the operation wound, whatever the operator did. He narrated some cases bearing out his contention.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

The Business and Ordinary Meetings of the Section of Ophthalmology were held on Wednesday, June 10th. 1914, Sir Anderson Critchett. Bart., C. V. O., President of the Section, in Chair.

The retiring President. Sir Anderson Critchett. was, on the motion of Mr. Higgens, seconded by Mr. Percy Flemming, accorded a very warm vote of thanks for his services in the Chair from the formation of the Section, reference being made by the speakers to the great services rendered to ophthalmology by his father and himself. Sir Anderson Critchett suitably replied. Thanks were also tendered to Mr. Treacher Collins on his retirement from the Council, and to Mr. Herbert Parsons as Senior Honorary Secretary.

Mr. Harold Whale showed a case of West's intranasal operation for dacryocystitis. Mr. Ernest Clarke asked as to the degree of permanence of the result, and whether any cases had been done a sufficient time to permit of this being known. If the effect was lasting it seemed an admirable method of short circuiting. Mr. Leslie Paton in discussing the case, reminded members of cases shown at the Ophthalmological Congress last April by Mr. Graham and himself in which a modified West's operation was performed. The results in those cases had lasted about 3 months satisfactorily and were still good. He described Mr. Graham's method of ensuring the exact super-position of the two holes, in the mucous membrane of the nose and that in the mucous membrane of the sac. Mr. W. Lang also discussed the case.

Mr. R. Affleck Greeves showed a case of supernumerary punctum lacrimale and canaliculus. There were four canaliculi, and many of these cases complained of epiphora, but in some the epiphora had nothing to do with the congenital abnormalities found. The condition was discovered accidentally, and therefore cases might be more numerous than they were supposed to be.

Mr. Rayner D. Batten showed a case of double detachment of the retina in a boy with functional albuminuria. The boy was in apparent good health, and there was no edema or heart trouble. Mr. H. L. Eason discussed the case from the point of view of the possibility of the detached retina going back, and mentioned a case of his own in which that happened.

Mr. E. Erskine Henderson showed the drawing of a case of a hole in the optic disc, and Mr. Charles Wray exhibited cases of multiple ruptures of choroid between macula and disc with 6/6 vision; also keratoconus treated by Snell's cautery and a case of traumatic dislocation of lens.

Mr. Holmes Spicer showed an interesting case of hydatids in the anterior chamber. The first indication of an abnormality in the eye occurred at the age of three months, and early in the case he thought it was a glioma. Later posterior synechiae developed and there was a clear cyst floating in the anterior chamber, looking like a soap bubble. It would be necessary to remove the eye. He promised a full pathological report at a later meeting.

Mr. Mayou showed a case of optic neuritis with symmetrical loss in the lower fields in diabetes. The patient had had a radical operation done on both antra. Mr. Paton expressed the view that it was neuritis due to accessory sinus disease, and not associated with diabetes.

Mr. Eason described a case in which a piece of steel lodged in the vitreous and had remained there 7 weeks without causing a growth of fibrous tissue over it and without reducing vision below 6/9. There was, however, a slight discoloration of the iris, which did not react to light. He asked for advice on the matter, expressing his view that it was best to leave it alone at present. With this the President agreed.

Mr. A. Hugh Thompson showed a case of detachment of retinal band due to a steel foreign body. It was extracted by means of a giant magnet. Later detachment occurred, but it got better, and then relapsed, and later had complete loss of vision.

Mr. Charles Wray read a paper entitled "Operative Treatment of Keratoconus." He said that to wait until thinning of the cone took place was as dangerous as the initial softening and needed justification in view of the efficiency and safety of operative treatment by means of the cautery in the early stages. When the diagnosis was certain and the correcting cylinder over 6D, active treatment was urged, especially if the patient was over 25 years of age and the astigmatism was progressive. Patients with conus should be seen frequently because there might at any time be a dangerous development. He deprecated attempting to do too much at one sitting; in the sub-evoluted forms excessive cauterization was likely to produce severe irregular astigmatism. It was undesirable to destroy or seriously injure Bowman's membrane, and he found Snell's cautery, at almost a black heat, was very satisfactory. So far, ophthalmic surgeons had confined their efforts in these cases to the surgical treatment of the fully-evoluted cone, which he likened to the policy of deferring the operation for radical cure of hernia until the tumor had incapacitated the patient. Owing to the thinning, very little burning at the summit of the cornea in this condition was apt to result in perforation. When the apex was thin and the pulsation very pronounced it might be worth while to perforate and thus destroy the centre. An unsatisfactory feature was the formation of a deeply-seated translucent star-shaped figure at the seat of puncture, consisting of folds of Descemet's membrane. This might later necessitate a sphincterectomy or optical iridectomy. For very advanced cases a special procedure was mostly needed for the summit of the cone. The paper was supplemented by a list of cases and results and drawings.

The paper was discussed by the President, Mr. W. Lang, and Mr. Leslie Paton, the latter describing a case which he operated upon by Sir Anderson Critchett's method 5 years ago, with an eventual good result. He only proceeded a certain distance in with the cautery, finishing with the Graefe knife, and that method in his hands yielded the best results though he had tried Mr. Wray's method.

Mr. E. Erskine Henderson read a communication entitled "Rupture of Optic Nerve at Lamina Cribosa." The case was that of a boy at 15 who was struck in the face by a brick falling from a cart. The blow on the eye did not render him unconscious. There was a large contused wound on the eyebrow and upper eyelid. Only the outer part of the iris was visible; there was no perception of light. A fortnight later the anterior chamber and vitreous had cleared sufficiently to allow of a view of the fundus. The lower half of the disc was represented by a hole. The inferior vessels had been torn across and the lens was partially dislocated. There was considerable enophthalmos. Only 12 similar cases appeared to have been recorded, since Hiss published one in 1856.

C. Devereux Marshall.

112 Harley Street W.

ST. LOUIS MEDICAL SOCIETY, OPHTHALMIC SECTION, FEB. 4, 1914.

Steel Within the Eyeball.

Dr. C. W. Tooker: Dr. Higbee asked me to present this case for him. The patient, a man 30 years of age, came to the office for treatment three weeks ago, two months after an injury to his left eye. A piece of metal from a hammer in one of the East Side mills had hit him in the eye and he presented himself for lid treatment only. On dilatation it was very easily seen that he had in the anterior temporal quadrant a torn retina with a small piece of iron embedded in the white sclera. X-ray localization confirmed the ophthalmoscopic findings. Extraction was accomplished by the small electric magnet with incision in the sclera under cocaine anæsthesia. It was not a difficult procedure. Vision is now 14-15. The interesting points are, the ophthalmic picture and the lack of history of intraocular trouble.

Retrobulbar Neuritis with Ethmoidal Involvement.

Dr. W. Hardy: A chapter of great interest in ophthalmology is that dealing with the pathological eye conditions resulting from accessory sinus disease. A consideration of the anatomical relations of the orbit and the nose and its sinuses will give cause for surprise not that ocular trouble arises so frequently from sinus disease, but that it does not occur more often. The best interests of patients will be conserved if oculists acquire a thorough knowledge of the anatomy and pathology of the neighboring structures and the remedial measures necessary for the alleviation of such eye trouble as is dependent on their disease. He need not apply such curative procedures himself, but without doubt should know when and where they are indicated.

As a routine measure pressure at the upper inner wall of the orbit should be made and it will elicit very acute pain should a frontal sinusitis be present. If the test is not made at the correct site, misleading information may be obtained, as firm pressure of the skin over the orbital rim or pressure on the supraorbital nerve will give rise to painful sensations. Pain at the root of the nose accompanies intranasal disease, frontal sinusitis and also occurs in exophoria and ametropia. Pain is not a prominent feature in the cases such as the one described in this paper. This patient had for a while a feeling of discomfort deep in the orbit, but no actual pain. In bilateral trouble we naturally suspect the sphenoid and in unilateral trouble the ethmoids, particularly the posterior ethmoid. According to Holden, the etiological factor in a non-toxic retrobulbar neuritis, narrows down generally to a multiple sclerosis or sinus disease. Peripheral scotomata and optic neuritis demand an examination of the nose in every case. The importance of thorough examination of the nose has been insisted upon by some writers, where no nasal symptoms seem present and even upon operation where the nose apparently shows nothing. It matters not what section of the optic nerve is involved by inflammations of the vicinity; operation is indicated and the sooner it is done the better. No anatomical examination of inflammations of the optic nerve in the optic canal have been made. Whether the condition is a result of a peri-neural oedema or an actual inflammatory condition of the tissues around the nerve, is undecided. The case report is as follows:

F. K., aged 27, blonde, single and painter by trade. Consulted me in November, 1912, stating that ten days previously, while walking along the street, he noticed he could not see well with his left eye. Vision diminished until at the time of his first visit it was reduced to fingers at thirty inches. O. D. V. 15-10. His history was good, being a man of excellent habits. He denied all venereal infection. He was careful about his hands and nails, thoroughly cleansing both before handling food. His work brought him little in contact with methyl alcohol. Five days after the onset of eye trouble and five days before his first visit, he took a cold as he expressed it. No particular attention was paid to it. He had had many previous colds. The discharge was mucopurulent and from both nostrils. Examination showed sluggish iris movements, media clear and fundus normal except that there was a slight tortuosity of the retinal veins and a slight haziness of the edges of the disc becoming significant by comparison with the right fundus. Throughout the entire course of the disease the fundus picture changed but little except that the disc became paler than its fellow and two small hemorrhages appeared, one near the upper border of the disc and the other several disc diameters up and out from the papilla. He returned to his family physician, who daily essayed to shrink the mucous membrane of the nose with little or no effect on either the ocular or nasal condition. After a week's persuasion he finally consented to an examination by a rhinologist and after more persuasion to an operation. The middle turbinate was removed, the ethmoid cells broken down and the sphenoid sinus opened up freely. The nasal work was done by Dr. Herman B. Miller. Improvement commenced very soon after the operation and proceeded rapidly.

The nasal discharge quickly subsided; vision improved until when last seen it was 15-10. The disc was still paler than its fellow. The etiological factors considered were plumbism, methyl alcohol poisoning, autointoxication, lues and ethmoid trouble. All but the latter were excluded before the rhinologist found positive evidence of ethmoid suppuration, so no hesitancy was entertained in urging immediate operation. It was felt that too much time had already elapsed between onset and operation. Proscrastination undoubtedly, in these cases, works for much harm and irreparable damage. It might be held and urged that the ocular trouble antedated the nasal and was in no way associated with it. On the other hand, I am convinced that the ethmoid infection existed latent, the result of prior infection and that it re-infected the nasal mucous membrane producing an acute muco-purulent rhinitis. The nasal condition as seen by Dr. Miller and the prompt improvement, both ocular and nasal, following the operation, bears out this contention and lessens the probability of its being a mere coincidence. There was no local treatment subsequent to the operation. Dionin was used before the operation. Internally medium doses of sodium iodide and strychnine were given and continued until the patient was discharged.

DISCUSSION. Dr. Post: All of us are especially interested in this comparatively new knowledge that has come to us in regard to this class of cases that formerly were obscure in their origin. I think the oculist should be prepared to examine these cases in such a way as to be pretty well satisfied as to what the condition is: but whether it is going to be feasible for the oculist to become expert enough to open up the sphenoid and the ethmoid cells to the advantage of the patient, when there are competent men who are giving special attention to these things, and who can treat the condition for him, hardly seems to me likely. I think every case which is brought to our attention of this sort is of great value and will help us materially in our work. The doctor speaks of exclusion of the other possibilities before taking up the question of the ethmoidal and sphenoidal condition as being the cause of these troubles. My own experience has been that in going over such cases I have found conditions that have lead me to send the patient to the laryngologist without making a diagnosis by exclusion. The doctor's method is wise. We should be careful and not jump at conclusions.

Dr. Charles: I would emphasize one symptom that has lead me to think first that the patient has a sinus affection, or, second, is a neurotic, viz., there being no signs of irritation either in the lids or the ciliary body, the patient complains of a deep-seated pain in the eye whether it is in use or not. It is not simply a pain in the orbit back of the eye, but a pain in the globe itself.

Dr. Hardy, in closing: The diagnosis by exclusion was not made as a matter of choice, but was done while the patient was deliberating about consulting a rhinologist. A tentative diagnosis of sinus involvement was really made at the first visit.

CORRESPONDENCE

SOME POINTS IN THE ANATOMY OF THE EYES OF BIRDS.

At the Oxford Ophthalmological Congress, June 9, 1914, Dr. Casey Wood gave an account of some of the more striking features of the avian eye. Although his address of an hour and a half was packed with interesting facts, it only gave a hint of the vast amount of original work which he, in conjunction with Dr. Slonaker of Leland Stanford university, has been doing. Among the more striking features which were brought out were the following: The prevailing impression that many tree-nesting birds come into the world with the upper and lower lids united, is erroneous. The fact is that, in the egg, up to the last stages, the eyes are wide open; and the closed lids which many young birds exhibit is probably the result of a light-reflex.

The upper lid is generally of slight importance, as compared with the lower eyelid, not to mention the nictitating membrane or third lid. The lower lid is the main agent for closing the eye during sleep, while the third lid does most of the work of cleansing the surface of the eye-ball.

In all of the species examined there was found a recurved fold near the margin of the third lid. This fold probably has the function of gathering the tears from the surface of the eye-ball and sweeping them into the wide openings of the canaliculi whence they are poured into the lachrymal duct.

The entire absence of a definite zonular ligament and the presence of a thick elastic ring of tissue around the margin of the lens makes it probable that the accommodative (striated) ciliary muscle changes the shape of the lens by pressure at the periphery; although the most important factor in active accommodation is the protrusion of the central part of the cornea.

The presence of over-lapping, thin, curved plates of bone in the anterior part of the sclera is very constant. These not only stiffen the scleral coat but probably act as springs to restore the shape of the eye when the accommodative muscle relaxes.

Lack of time prevented a consideration of the deeper structures. The address was illustrated by numerous, original lantern slides. H. G.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Lee Wallace Dean has been made Dean of the medical department of the University of Iowa.

Dr. A. Edward Davis of New York was married to Miss Josephine K. Robinson, on July 30.

Dr. Flavel B. Tiffany of Kansas City is receiving congratulations upon the birth of a son.

It is announced that Prof. A. v. Hippel has resigned and will be succeeded at Göttingen by his son E. v. Hippel of Halle.

The Wills Eye Hospital, Philadelphia, receives a bequest of $2,800 by the will of the late Mrs. Jane S. Echternach.

Dr. T. W. Moore of Huntington, W. Va., has removed to 204 First National Bank Building.

Among American doctors delayed in Europe by the war are Hansell, Sweet and Zentmayer of Philadelphia, and Wood and Nance of Chicago. Wood and Nance have reached home safely.

Dr. Geo. E. de Schweinitz has resigned as ophthalmologist to the Philadelphia General Hospital and has been succeeded by Dr. Edward A. Shumway.

The annual announcement of Leland Stanford presents the following eye staff: Dr. Adolph Barkan professor, and Dr. Albert Brown McKee clinical professor.

The following deaths of ophthalmologists are announced:
Dr. Adelaide Tucker of Bradford, Pa.
Dr. Wm. H. Carpenter of Brookline, Mass.
Dr. Henry C. Eno of New York City.
Dr. Alexander Ogilvy of Bristol, England.

The Public Health Service is continuing its investigations of trachoma. Conditions in North Carolina are better than in the adjoining states. The same interesting observations were made here as in the Virginias and Kentucky; namely, that the negro is practically exempt from trachoma and foreign immigration plays an inconsiderable part.

The following foreign appointments are announced:

Dr. Gordon M. Holmes, physician to Moorfields Hospital, London.

Mr. W. B. Brownlie, assistant ophthalmic surgeon to Blackburn and East Lancashire Royal Infirmary.

Mr. Arnold Renshaw, bacteriologist to the Manchester Royal Eye Hospital.

Mr. M. W. B. Oliver, assistant surgeon to the Central London Ophthalmic Hospital.

Drs. Wolfram of Leipsig, Hesse of Gratz and Adam of Berlin have received the title of professor.

The biennial report of the coroner's office of Cook County, Illinois, for 1912-1913, is out. It is a revelation to find that what is called "dry statistics" can be worked up into a form to be more entertaining than any novel, problem play or moving picture show at their best. Who would have thought before reading Coroner Hoffman's masterly report that the annual number of accidents in the homes of Chicago are greater than the casualties of the streets, that more people are maimed or killed falling down stairs, out of windows, from porches, accidental shootings, asphyxiations, etc., than the total number of accidents in the street, automobiles, horse vehicles, street cars, falling objects, etc., proving by statistics that it is more dangerous to stay at home than to go downtown.

The report has an introduction by Mr. Geo. H. Whittle. President of the Public Safety Commission, that pays high compliment to the Coroner for his many years of struggle to initiate organization in the interest of Public Safety.

Space has been given in the report for concise statements by Mrs. Ella Flagg Young, Superintendent of the Chicago Schools, and Mr. Edward R. Tobin, Superintendent of the Cook County Public Schools, on the subject of how to educate children so as to implant habits of carefulness and caution to enable them to avoid accidents.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C., Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

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ORIGINAL ARTICLES

A CASE OF "SQUIRREL PLAGUE" CONJUNCTIVITIS IN MAN.

(*Bacillus tularense* Infection of the Eye.)

DERRICK T. VAIL, M. D., F.A.C.S., CINCINNATI, OHIO.

(Read before the Ophthalmic Section of the Michigan State Medical Society at Lansing, September 10, 1914.)

It is believed that this is the first report of infection of the human eye from the virus of a plague-like disease among certain rodents, notably the California ground squirrel, and now known as "Squirrel Plague."

The case which I bring to your attention in this report presented such unique, alarming and peculiar ocular symptoms that it was impossible from anything written in ophthalmic literature to render a clinical diagnosis.

I have to thank Prof. William B. Wherry, of Cincinnati, who has won renown as a bacteriologist working for the government in the plague-stricken district of California during the recent epidemic of bubonic plague there, for the diagnosis. Without his splendid, accurate and convincing laboratory work, this case would have passed into oblivion, unrecognized and undiagnosed.

The present paper will embody the following:

(1st) A short historical review of California squirrel-plague, which existed simultaneously with bubonic man-plague in 1900-1910, and which was at first thought to be identical with it.

(2nd) A report of my case of eye-infection from the known bacillus of squirrel plague and a sketch illustrating the appearance of the case at its climax.

(3rd) A brief report of the laboratory work of Prof. Wherry, bacteriologist, and B. H. Lamb, senior student Ohio-Miami Medical College, Cincinnati, who diagnosed and proved by culture methods, animal inoculations and experiments that the ocular disease in my case was due to the so-called *bacillus tularense* of McCoy and Chapin, or the "Squirrel-Plague Bacillus."

Historical Data on California Squirrel Plague.

On December 8, 1908, the *Journal of Infectious Diseases* (Chicago) published an article by Dr. Wm. B. Wherry, at that time bacteriologist for the San Francisco Board of Health and temporary assistant surgeon of the United States Public Health and Marine Hospital Services, located at Oakland, California, on *"Plague Among the Ground Squirrels of California."* It is from this article that the following historical notes are gleaned:

The bubonic plague first appeared as an epidemic in the United States at San Francisco in 1900. The presumption was that plague-infected rats infesting incoming ships from the Orient found their way ashore and that they constituted the source of infection for the human cases through the fleas that they harbored.

The human epidemic was at first practically limited to the inhabitants of Chinatown, San Francisco. In 1900 there were 22 fatal cases, in 1901 there were 30 cases with 25 deaths, in 1902 there were 41 fatal cases; in 1903, 17 cases died; in 1904, 9 cases with 8 deaths. All these cases were located in San Francisco.

The United States officer in command of plague suppression was Surgeon Rupert Blue, the same who is in charge of the bubonic plague situation in New Orleans at this present writing (1914).

Blue first suspected in 1903 that the plague which was destroying ground squirrels in such great numbers, as was being reported from many parts of the country about San Francisco, was nothing other than bubonic plague, and he so published his suspicions to the authorities at that time, but was unable to secure dead animals for proof. Soon, however, human cases of *plague-like* infection began to appear in country districts, in which no reasonable mode of conveyance other than through squirrels seemed plausible.

Take the case of Charles Bock, a country blacksmith, who came to San Francisco (August, 1903) from a neighboring village, and died of the plague. Surgeon Blue visited his town and learned that Bock had shot ground squirrels three or four days before his illness began. The following September (1903) another victim from another part of the country died from plague, a man who had been living in a railroad camp thirty miles from civilization, and it was learned that these rough laborers often killed and ate ground squirrels. In 1904 rural cases continued to be reported here and there, and Dr. Blue, who was keen on the suspicion that ground squirrels were furnishing the infection, conducted a series of experiments through the aid of Assistant Surgeon Donald Currie, bacteriologist for the plague laboratory, and proved that the ground squirrel was very susceptible to plague infection, both by inoculation and direct contact. Blue then (1904) sent a man to investigate the county of Contra Costa to ascertain the truth of the many reports that came through various sources that the squirrels were being exterminated by a plague. This agent reported that the farmers were everywhere rejoiced at the disappearance of the ground squirrel. He also learned that the squirrels had been suffering from an epizoötic.

It was then learned by another investigator (Past Assistant Surgeon J. D. Long) that armies of ground squirrels were seen at different times between the years 1903 and 1905 to be migrating across the country. Farmers had endeavored to secure sick squirrels to carry home to spread the infection. They burrow the ground, feed on grain and multiply so rapidly that they had become a great pest. In fact, one man offered a bounty of $20.00 for a single sick squirrel.

After the earthquake of 1907 true bubonic plague cases appeared in alarming numbers in San Francisco. There were 156 cases with 78 deaths, and country cases continued to appear, so that Blue directed his men to trap and collect rodents from Contra Costa county that a thorough search for plague might be made. Four hundred and twenty-three ground squirrels were sent in and among them were found four genuine cases of glandular suppurations in sick squirrels.

In spite of this, many doubted that the disease in man was contracted from squirrels. Soon, however, a case appeared in Los Angeles, which proved the direct communicability of the infection from squirrel to man without the intervention of fleas or biting insects. A boy ten years old ,living in Los Angeles, found a sick ground squirrel near his home. Being moved with compassion, and thinking he would take it home, nurse it and make a pet of it, he picked it up, but the animal bit him on the finger. On the fourth day, after he was taken very sick with fever, delirium, etc., and the glands of the axilla on that side became swollen and painful. The abscess in the armpit was aspirated, and G. W. McCoy, who was studying the case, found by experiments on guinea pigs and rats that the organism was similar to *Bacillus pestis.* Suppurative glands appeared elsewhere, but the boy finally recovered. In view of the fact that Currie had demonstrated that the saliva from the mouth of an infected squirrel was laden with infection. due most likely to the influence of plague pneumonia that was demonstrated, it is beyond question that this boy was directly infected from the bite of the squirrel and not from flea bites.

The experiments which proved infection by *direct contact* and which were carried out by Currie in 1904 were as follows:

Out of six healthy squirrels that were caged with plague-sick squirrels, three died of plague. Curry rubbed the shaved abdomen of a healthy squirrel with plague-infected spleen and placed it in a cage with two other healthy squirrels. In three days the infected squirrel died of plague and the spot which had been rubbed showed plague-dermatitis. In nine days one of the two healthy squirrels died of plague and in thirteen days the other likewise died.

It was then thought by many that squirrel-plague and bubonic plague were one and the same disease. This, however, proved untrue, for Past Assistant Surgeon George W. McCoy, of San Francisco, finally came out with a classical paper on the subject (see *Journal of Hygiene,* 1910, pages 589-601) and proved among other things that there was a *distinct difference* between true bubonic plague and squirrel-plague, the latter being less violent and the bacillus causing it being different from the true *Bacillus pestis,* although closely allied to it (see also *Journal of Infectious Diseases,* 1909, page 676), and that fatal squirrel-plague is *not identical in its pathology with fatal bubonic plague.*

Finally, in 1911 (see *Journal of Infectious Diseases,* 1912, page 71), McCoy and Chapin *identified the germ of squirrel-plague,* grew it on egg-yolk culture, proved its entity, described it fully and named it *"Bacillus tularense"* after the county of Tulare, in California, in which the disease was first observed. They state "the essential pathological lesions (of fatal squirrel-plague infection in rodents) are many whitish or yellowish caseous granules in the spleen and liver." Caseous nodules also appear in the lymph glands.

Report of My Case of Squirrel-Plague Infection of the Human Eye.

E. E., male, aged 28, referred to me on November 24, 1913. by Dr. Paul DeCourcy, of Cincinnati, on account of an acute and violent inflammation of his left eye.

Occupation: Meat cutter in restaurant.

Family History: Negative.

Personal History: Measles at age of 7, mumps at age of 7; no other illness. Denies venereals.

Present Illness: Three days ago left eye became inflamed and swollen. Tried medicine prescribed by a druggist, but eye became rapidly worse. The lid margins were agglutinated of mornings. Notices a "sore lump" in front of the left ear. Eye discharges much watery secretion. Has no pain; vision unaffected.

Status Praesens:

External inspection: Right eye, normal.

Left eye: Marked redness and swelling of both eyelids.
Intense chemosis is present.
Eye discharges muco-watery secretion.
Lashes are matted. tuft-like.
General appearance of eye suggests gonorrhœal ophthalmia.
The pre-auricular gland on that side is swollen to the size of a small cherry and is tender to touch.
Cornea, clear.
Tension, normal.
Iris, normal.
Pupil, normal in size and reaction.
Dioptric media, clear.
Ophthalmoscopic examination, negative.
Vision, normal.
Palpebral conjunctiva: On everting the eyelids, the seat of disease is revealed. The conjunctiva is riddled with about ten discrete deep, round, yellow necrotic ulcers, that run clear through the substantia propria of the conjunctiva quite to the tarsus. There are six such round ulcers over the upper tarsus and four at least over the lower tarsus. The ulcers appear punched

out, but filled with golden yellow necrotic plugs. Sizes vary from 6.0 m.m., the largest, which exists near the upper edge of the tarsus of the upper lid, to about 1.0 m.m. The surrounding conjunctiva is deep red, very soggy and swollen. but does not bleed on being wiped with a wet cotton sponge. The necrotic plugs in the beds of the ulcers cannot be wiped away. The contrast between the deep red color of the conjunctiva and the brilliant golden color of the ulcers is as striking as a turkey-red calico dress with yellow "polka dots."

A smear was taken at once to search for the gonococcus, but none found. Cultures in nutrient agar and blood serum made, but nothing beyond mixed infection revealed after 48 hours. Patient warned as to the likely contagious nature of his trouble, and was taught how to cleanse his eye and treat himself with the antiseptic and astringent washes and the yellow oxide mercury ointment which were prescribed. Diagnosis of Parinaud's conjunctivitis tentatively made.

November 25, next day. Eye looks worse, patient pale, temperature 100, preauricular gland more swollen, the lymph glands of the anterior triangle of the neck and submaxillary region of that side are easily felt to be enlarged and are tender. Diagnosis of Parinaud's conjunctivitis withdrawn on account of the ulcers. Too acute for tuberculosis and certainly not chancre or syphilis.

November 28. Patient is losing weight rapidly, looks cachectic and sick, temperature 102, glands of the left side face and neck are conspicuously large and now there is seen a discrete pustular eruption six or seven in number and 4 to 5 m.m. in size, something like the pustules of varicella, located on the left temple and malar region. The appearance of the left eye is not improved; cornea is, however, brilliant and vision unaffected. The left nostril discharges a watery mucus freely. The left turbinated bodies are swollen and red. On account of the nasal symptoms and the pustular eruption on the left malar. the diagnosis is changed to "Glanders or Farcy" and patient urged to go to the Cincinnati Hospital. where he could get the benefit of proper treatment and laboratory diagnosis.

December 1. Patient did not go to the hospital; objected to leaving his family. Wants to continue treatment at my office. A new symptom has developed since two days ago. Infection of the left lachrymal sac with every evidence of abscess formation. The ulcers of the conjunctiva remain about the same in appearance, but are slightly more numerous. They are not epithelial ulcers, such as we see in herpes, but per-

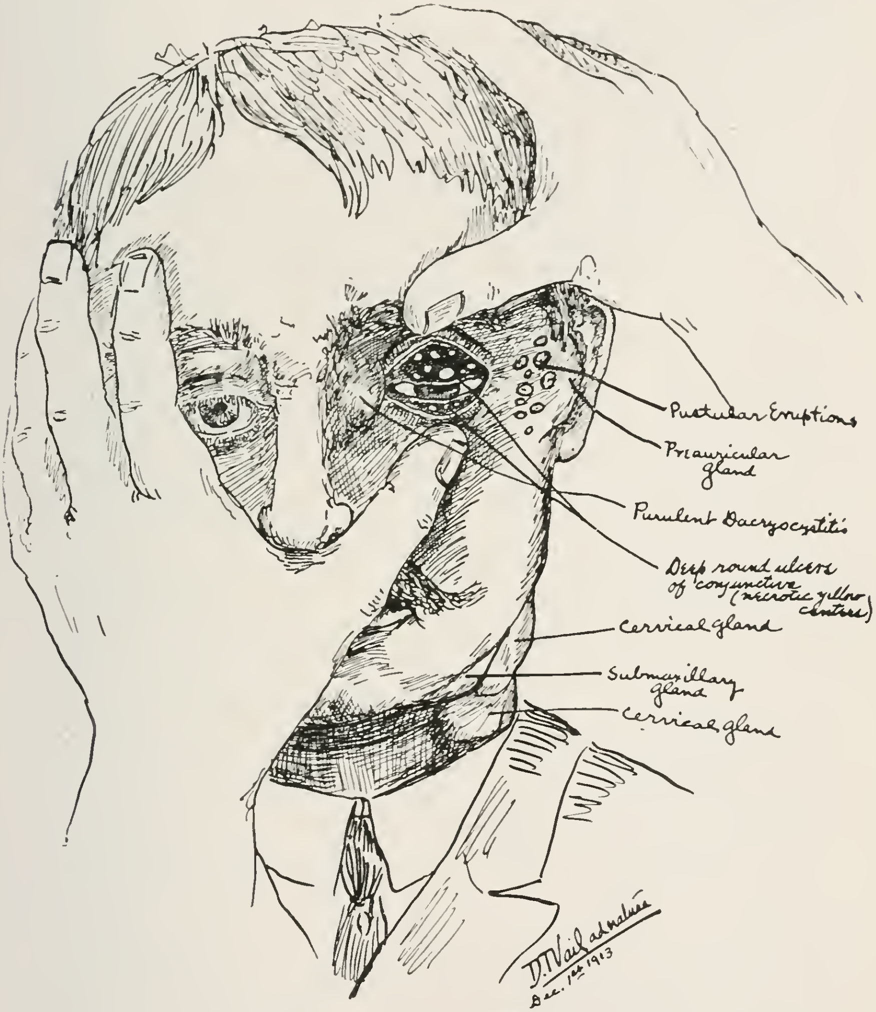

Fig. 1. Showing Necrotic Lymph Nodes in Squirrel Plague Conjunctivitis and Glandular Involvement of Face and Neck.

forate the conjunctiva quite to the tarsus. *Evidently the solitary lymph nodes of the conjunctiva are the seat of the necrosis.* The accompanying sketch was made to illustrate the appearance of the case at this time. His family physician, Dr. De Courcy, finally persuaded him to apply to the Cincinnati hospital for treatment. Dr. Robert Sattler was on duty at that time and we find the following clinical memoranda:

Right eye: Normal.

Left eye: Lids puffed and reddened.

Swelling size of hazel nut at inner canthus (purulent dacryocystitis.)

Ocular conjunctiva much congested.

On eversion of the lids the palpebral conjunctiva much thickened, roughened and reddened.

Conjunctiva ulcers are present.

Pressure on tear sac, which has consistency of well-filled bladder, does not evacuate it into the eye or nose.

There are a half-dozen large pustules between the left eye and ear.

The anterior auricular and anterior cervical glands and those about the angle of the jaw are enlarged.

There are no glandular enlargements at the right side of the face.

Lungs: Negative.

Heart and circulatory apparatus: Negative.

Abdomen: Negative.

Extremities: Genitalia: Negative.

December 9. Abscess of the tear sac incised, discharging yellow, creamy pus.

December 10. Drainage from the abscess has ceased. Conjunctiva ulcers gone. Ocular condition much improved, but the preauricular and other glands remain enlarged.

December 11. Patient discharged, improved. The temperature chart shows the typical rise and fall of a general septic infection, highest being 102.6, evenings of December 4 and 5, but the morning temperature never below 100 until after December 5.

Several unsuccessful attempts were made to see the patient after he left the hospital, Student Lamb calling at his residence several times and I sending him three letters, asking him to call and see me. He wrote me he was well and back at work, but we never saw him again. Evidently he had had enough of the doctors.

HOW COULD THE INFECTION OF THE CALIFORNIA GROUND-SQUIRREL-PLAGUE FIND ITS WAY INTO E. E.'S LEFT EYE IN CINCINNATI?

This is a question that is hard to answer definitely. It has been proven by various students of the disease—Blue, McCoy, Chapin, Currie, Long, Wherry, and others—that all rodents are susceptible to infection by direct contact, squirrels and rabbits particularly so. Three facts are significant:

(1) Wherry in his last article, just published (see *Journal of Infectious Diseases,* September, 1914), says that "a year previously (to this case) we had heard from a hunter that wild rabbits were dying in large numbers across the Ohio River in Kentucky." Moreover, this man was infected during the hunting season when the market is open to the sale of rabbits, and I, myself (being a hunter), was interested in reading in a Cincinnati daily of date about November 20, 1913, a note from rabbit hunters in the vicinity of Cincinnati, stating they were finding large numbers of dead rabbits in the fields and the opinion that they were being exterminated by a plague of some sort.

(2) Health Officer Landis, of Cincinnati, learning the markets of the city were selling rotten rabbits, investigated and found large quantities of putrid rabbits on sale at five cents apiece. He rightly condemned all of them and reports that 36,420 pounds of decayed rabbits were seized and destroyed between November 1 and December 6, 1913. My patient was infected in the height of this season.

(3) My patient was by occupation a meat cutter in a cheap restaurant located in the tenement and slum district of the city close to the markets. The inference is fair that rabbits affected with caseous buboes came to his table for cutting, that he held the diseased meat in his left hand, cutting with the knife held in his right hand, and that he introduced the poison into his left eye from his left finger. We have no proof for this, but it would pass for "Sherlock Holmes" evidence.

Proof of Squirrel-Plague Infection in This Case, by Prof. Wherry, Bacteriologist, and Senior Student B. H. Lamb.

A full detailed report of Prof. Wherry's investigations, culture methods, inoculations, animal experimentations and post mortems in connection with the case is published by Wherry and Lamb in the current issue of the *Chicago Journal of Infectious Diseases* (September, 1914), illustrated in colors and photographs by Prof. Wherry.

"Guinea pig No. 1 received on December 4, 1913, an intraperitoneal injection of scrapings from a conjunctival ulcer from the patient's eye, suspended in normal sterile salt solution." Died December 10. Post mortem shows acute pneumonia; the spleen and liver are congested and enlarged and show numerous scattered foci of necrosis. No bacteria found on various smear preparations variously stained. Various culture media remained sterile as to ærobic and anærobic bacilli for a month.

"The disease was kept going through a series of guinea pigs while isolation experiments were in progress"; nothing definite was found, but "after passing the virus through twenty-four animals, we (Wherry and Lamb) became acquainted with the work of McCoy and Chapin (see above) and by using the *coagulated egg-yolk,* on which they were able to grow *Bacillus tularense,* we isolated what we believed to be *the same bacterium.*"

The Berkfeld filter prevented the germ from passing through, as proven by experiment injections on guinea pigs. This corroborates McCoy and Chapin's findings, "while guinea pig No. 20, used as a control, was injected subcutaneously with 2 c.c. of the unfiltered extract. It died in three days with typical lesions and *B. tularense* was isolated in an ovomucoid-yolk culture from an inguinal bubo."

The tests and measurements of the bacillus by Wherry tallied very closely to those of McCoy.

In carrying out their investigations to prove this case, Wherry and Lamb used "forty-nine guinea pigs, three Belgian hares, three white rats, three kittens and one pigeon." "The guinea pigs, as a rule, succumbed on the fourth or fifth day after cutaneous inoculation with spleen juice or when pricked in the eye with an infected needle" and again simply dipping a fine needle into the spleen of a dead animal or into a culture and pricking the ocular or palpebral conjunctiva of rabbits or guinea pigs results in the production of multiple areas of necrosis on the palpebral conjunctivæ, *just like those in the human case,* and is followed by septicemia and death in a few days.

Wherry showed me the head and viscera of rabbit No. 1, which had been pricked in the conjunctiva, as above suggested. The eyelids were everted on tooth-pick stays and presented the same typical round necrotic ulcers my case had presented; moreover, the lymph glands in front of the rabbit's ear and down the side of its neck were greatly enlarged.

The white rats inoculated intraperitoneally died in two days or less. The kittens survived. *An infected emulsion was dropped in the healthy eye of guinea pig No. 38. It died in four days' time. The conjunctiva presented the same round ulcers and the lymphatic glands of the neck were markedly involved.*

Guinea pig No. 34 was fed on most of the spleen of a dead guinea pig. It died in three days' time.

From the evidence submitted, I think we may make the claim beyond doubt that the case of E. E. was one of squirrel-plague ophthalmia, and I believe the *first case on record.*

24 East Eighth street, Cincinnati.

TREATMENT OF THE EARLIER STAGES OF SENILE CATARACT.*

BY LT. COL. HENRY SMITH, I. M. S.

HON. SURGEON TO THE VICEROY; CIVIL SURGEON, AMRITSAR.

The earlier stages of cataract we may divide roughly into two: 1. The stage we can treat without operation; 2. The stage in which operation is necessary.

1 The diagnosis of the earliest stage of cataract does not appear to have received the amount of attention which it deserves, if we are to measure such attention by what has been written on the subject; partly, I suppose, because the ordinary patient pays little or no heed to deteriorating distant vision, so long as his vision is efficient for near objects. Perhaps a larger proportion of this class of cases comes to us earlier in the Panjab, than to you in Europe, cataract being so prevalent and appearing in the prime of life, so most of my patients are quite aware of the possibility of the onset of cataract, and fear it. I have been devoting a good deal of attention to this

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*Read at the Ophthalmological Congress, Oxford, England, July 9th, 1914.

subject for the past few years. Among other patients I have a large section of railway, whose officials I have to examine once a year for vision. When their vision falls below 6/6 they are no longer fit for duty; such patients remain under my observation of necessity. The first symptom the patient complains of, especially railway officials and sportsmen, is that his distant vision is failing, no complaint being made of the near vision. A man's vision will be reduced down to 6/15 or even 6/18, before he complains severely of near vision. At 6/12 or better he seldom complains of vision for near purposes. (I am assuming throughout that his vision, formerly, was normal.) This is the characteristic symptom of the earliest stage of cataract—a symptom which should cause the general practitioner to send the patient to a specialist.

For our present purpose let us carefully exclude cases with any fundus or vitreous trouble, or any retro-bulbar condition. The vision not having fallen below 6/10th, we seldom observe any opacities in the lens. At 6/12ths we may find sand-like opacities or striae, central or peripheral. Above 6/12ths we nearly always find these conditions. The cases in which the vision has been reduced to 6/8ths, 6/9ths or 6/10ths, without any opacity in the lens, show loss of transparency merely. With an acetylene light, for example, you examine a healthy eye at the same time with one of these, and you observe that while the former is absolutely clear the fundus of the latter appears as if you were examining it with a poor light. If we could put the difference of the clearness of the fundus of these two eyes in some formula we could estimate for scientific purposes the degree of the loss of transparency. For the present we have to be content with the test cards for this purpose. In diagnosing these cases for treatment, for statistical purposes, we have to be very careful to exclude all other diseased conditions which would interfere with vision; the treatment which I adopt would influence many conditions of the cornea, of the fundus, and retro-bulbar conditions, favorably, though combined with a corresponding stage of cataract and would thus, consequently, vitiate statistics sometimes unduly favorably, sometimes unduly unfavorably.

Given a case which is sound apart from this stage of cataract, with distant vision reduced to 6/8ths, 6/9ths or 6/10ths, 25 minims of a 1 in 4,000, 5,000 or 6,000 solution of cyanide of mercury, according to the age of the patient (the younger the patient, the stronger the solution required to produce the standard reaction), injected sub-conjunctivally, the patient being under the influence of cocaine locally and having had a hypodermic of morphia up to half a grain an hour previously, will, in my observation, within a month of the injection bring this patient's vision back to 6/6ths or even 6/5ths, and at the end of three months he will be one line better on the test card. The railway officials under my care, having to appear before me once a year, seldom fall below 6/10ths until they come under treatment. I give them a month's leave, and an injection of cyanide of mercury, and by the end of the month they go back to duty with the full amount of vision required; that is, patients who have fallen to 6/8ths, 6/9ths or 6/10ths. I have a number of these men under observation for more than a year and so far the results appear to be enduring. I have an officer in the Indian army, whom an invaliding board declared to be unfit for any service on account of his eyesight. He was blind in one eye and the other was in the early stage of cataract without opacities. He came to me; I asked the authorities to give him a grace of three months; at the end of this time he appeared before the same board with vision equal to 6/5ths, and was passed for duty and is now either first or second in command of his regiment. He was treated about three years ago so the result may be considered as enduring. I have a number of sportsmen and others with similar results. I am sorry that I have not got my records with me, as I came home on very short leave, intending to do nothing. Your worthy secretary insisted on my contributing something to your proceedings and I can thus only give you generalities and odd cases from memory.

Cases with sand-like opacities, if the pupillary area is clear of opacity, respond equally well to sub-conjunctival injections of cyanide of mercury. I have not so much hope of the permanence of the result in these cases. With vision down to 6/18ths, the pupillary area being fairly clear, great improvement follows, but these cases rapidly relapse. (Throughout I am speaking of the light in the tropics.) The number of patients in Europe (where cataract matures so much more slowly than with us) who suffer from the early stage of cataract and who go to their graves before it has reached what we call immaturity, must be considerable.

I would like to impress on those who may be disposed to devote attention to this line of treatment that as regards statistics they should be very careful in the diagnosis that they are selecting cases appropriate and uncomplicated by any fundus or retro-bulbar condition. The dream of both patients and ophthalmologists has been to discover some method of dispersing, as the patient calls it, cataract, or preventing its development, or both. I think we are on the track; I have little doubt of it myself. I do not for a moment think that cyanide of mercury has any more potent action than other agents which would give a similar amount of reaction. What is the cause or ordinary senile cataract? Can we argue backwards from the above facts towards a solution? Nutrition by osmosis never appealed to me. Is senile cataract due to starvation through a condition of the nutrient channels corresponding to atheroma of the arteries, or is it due to a bio-chemical poison? Is the nutrient fluid of the lens manufactured by a special mechanism and if so, is that mechanism some of the gland-like cells of the ciliary region? If so, we could understand these cells assuming a pathological function and recovering therefrom under treatment. After all this would only be the proximate cause, not the more remote one. The more remote cause of senile cataract in the Panjab seems to be connected with the dietary. The area of prevalence of stone in the bladder covers roughly the same area as cataract; and in all these areas the staple food is wheat, not rice. But on this matter I am not dogmatic; I have got no theory nor has any theory yet been advanced which will harmonize with the facts.

2. The Early Stage of Cataract in Which Operation Is Necessary.

By this we mean a condition of the lens in which there are definite opacities sufficient to deprive the patient of useful vision, but in which there are varying degrees of transparent or living lens matter—a condition commonly known as immature cataract. The previous class merges into this one by imperceptible degrees. From the patient's point of view this class demands urgent consideration on account of the depressing influence that waiting involves, and the financial ruin that awaits them at the end of the waiting period. Those in extensive practice in the treatment of cataract will, I am sure, realize this fact. I have frequently been told by lawyers, for example, with mature cataract, that five years previously they could have paid any fee and would have paid any fee for relief.

but that now they are practically paupers. So much for the waiting period.

My long distance patients are almost all of this class, and they come to me because their own surgeon refuses to operate and tells them that they must wait the maturing of the lens. I think I may take for granted that the capsulotomy operation is not satisfactory for the treatment of these cases, and that the different procedures adopted for hastening the maturing process are not satisfactory. I certainly would not get so many of these cases if other competent men found the direct capsulotomy operation or the maturing procedures satisfactory. The direct capsulotomy operation for these cases is very disappointing owing to the difficulty, I might say impossibility, of removing the living lens matter from the capsule; its consequent proliferation and the formation of a very dense after-cataract, to which the iris is frequently tied down, and which is very difficult to deal with. The latest ripening procedure, I think, is American; it consists in the deliberate production of a traumatic cataract and the extraction of it within a few days of its production. This ripening procedure is, in my opinion, the worst of the lot. It implies, among other things, the liberation of lens matter into the aqueous chamber and as a consequence certain iritis, and the extraction of the lens under these conditions—the most difficult of all cataracts to deal with, together with the fact that it courts serious complications.

The fact that senile immature cataract can be extracted in capsule as easily as mature cataract, and with as uniformly good results, is one of the strongest claims in favor of intracapsular extraction of cataract. The normal senile lens is just as easily dislocated as the mature senile cataractous lens. We come across cases of slowly ripening senile cataract, associated with disease of the choroid, which is probably to a large extent dependent on that disease. This is the type of immature cataract which we find not infrequently very difficult to dislocate. It is a type which I would advise the novice not to tackle with a light heart. We succeed in partially dislocating the lens adjacent to the wound; it refuses to move any further. We need to be ready, without delay, to slip a spatula behind it and to cause it to slide up the spatula by pressure from outside the cornea, taking care not to nip it between the instruments. To do this neatly is what I consider the last accomplishment of a highly accomplished operator. The normal senile immature cataract is one of the simplest of all cataracts to extract by the intra-capsular method. In favor of intra-capsular extraction we have the almost entire absence of iritis: we have no after-cataract to deal with, and we can operate on cataract at any stage.

It has frequently been laid down both in Europe and in America that the eye of the white man is different from that of his Aryan brother. I have now done many cataracts on pure Europeans, many more in different degrees of dilution of European blood, and I can see no difference. A difference which probably does exist between the European and the Panjabi is that in the Panjab we get cataract much earlier than you do in Europe or America, and that we probably thus operate on a higher proportion of people with a sound fundus, in which case our average resulting vision would be better. I have a number of men between 40 and 55 years of age in the Indian army doing full duty including long range rifle shooting, wearing cataract spectacles.

Another objection raised to the intra-capsular operation is that we cannot do it without an iridectomy. This is not the case. The operation is as easily done without an iridectomy as with one: I have frequently done it through an opium pupil without difficulty. The same principle holds as regards an iridectomy in this operation as in the capsulotomy operation.

It has also been objected that we do not obtain the keyhole pupil often observed after the capsulotomy operation. This is strictly correct: we get a U-shaped pupil. The explanation of the difference is that our iris is free, whereas the pillars of the coloboma following the capsulotomy operation are tied down to the after-cataract, hence it is keyhole. I have frequently extracted the after-cataract following the capsulotomy operation, in cases with a beautiful keyhole coloboma. It was interesting to see that the keyhole disappeared and that a U-shaped pupil was the result. If you consider the matter from a mechanical standpoint this reasoning and result will be evident. If you atropinize, or homatropinize an eye with this keyhole pupil you will observe why it is keyhole.

I would like to draw your attention to the progress of intra-capsular extraction in India. When I first began the teaching of intra-capsular extraction there were about 5,000 cataracts done yearly in the Panjab Province. In 1912 the number had increased to about 15,000, and in 1913 I understand that it is between 16,000 and 17,000 in the same area. These are practically all intra-capsular; at least 90 per cent of them are. In other Provinces where intra-capsular extraction is becoming the operation of election, similar progress is being made. I think I can see the day not far distant when intra-capsular extraction will be the operation throughout the Indian Empire, and when 60.000 cataracts a year will be done in that Empire.

I feel that this is a rather disjointed discourse, simply touching on the outskirts of a big subject, but the interest is more in the discussion to follow than in this paper. I shall be delighted to answer any questions or give any details connected with the subject as far as I can and I think it is better to leave more time for discussion than to read a longer paper.

It is my hope that in the near future some generous people associated with a generous government will found a post-graduate school of ophthalmology in the Panjab—that area of the world in which diseases of the eye are most prevalent, and that it will be hampered neither by finance nor by spheres of influence. That this school will be manned by clinical and research workers, sufficiently to utilize the enormous amount of material available for teaching. The Indian Empire requires such a school for the training of its own staff and for the doing of research work in ophthalmology—a matter which so vitally concerns the people of our huge Indian Empire. It should not be forgotten that it is the surgeon who has commanded the confidence of the people of India for western medicine; and that it is he who still continues to command their confidence, and that without him there would be little respect today from the people of India for medicine or sanitation.

Single-handed and unofficially I have been doing what I could in the teaching of men, both Indian and European, in addition to my ordinary duties. This, of necessity is confined to the clinical side and to a limited number. To cover the whole ground and to do my official work would of course be absolutely beyond the physical capacity of one man. A school thus established would be in a position to give as fine a training in pathological work as any in the world: the fields open in research work are unlimited and seductive. In the clinical and operative side we should be able to give the finest course of training in the world on account of the vastness of our material. So I hope we will be able to welcome you to our Indian School of Ophthalmology in the not distant future.

SOME HISTORICAL DATA CONCERNING GLASSES.

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It is a matter of surprise that neither eye glasses nor spectacles were known to the ancients, although the art of glass manufacture is very old. Tradition and superstition concerned themselves somewhat with the matter. It is said that a Chinese emperor used lenses as early as 2283 B. C. to observe the stars. There is a legend of Confucius which anticipates modern scientific ophthalmic practice in a surprising manner. Confucius (B. C. 551-479), on calling for his shoes at the cobbler's shop where they had been left some days before, was surprised and vexed to learn that the shoes were not ready. He upbraided the cobbler who, however, had a most satisfactory excuse. His high-tempered wife had thrown pepper in his eyes in a moment of righteous anger, with the result that the husband was compelled to postpone his work. Confucius treated the poor man's eyes and also gave him a pair of glasses. In a short time the cobbler was well of his conjunctivitis and, more wonderful still, whereas he had always been cross-eyed he now had perfectly straight eyes. It is said that the wife refused to recognize the cobbler as her husband, for she had undoubtedly married a man with a squint. The cobbler, however, if we may believe the story, continued to wear his glasses with great comfort and lived a life of peace and quiet.

Among the Chinese the tortoise was a sacred animal; therefore tortoise-shell rimmed glasses were conducive to good fortune and long life. Lenses were made of rock crystal, quartz, topaz, and amethyst, stones which were found among the sacred mountains and further insured good luck. The wearer of spectacle frames was a man of dignity and learning. His frames probably had no lenses whatever, but were in themselves badges of superiority. If an inferior met a superior on the street the former removed his glasses as a matter of respect. This curious custom survived in Germany until a very recent date.

There is no evidence that the Hebrews, Greeks or Romans had any knowledge of glasses. The oft repeated story of Nero viewing the gladiatorial games is not credited by scholars. The probable explanation is that Nero used a large concave emerald mirror from which the scenes were reflected. The references to

Nero's eye defect indicate that he was astigmatic and perhaps hyperopic, but not myopic. The remains of convex glass found in the excavations of Nineveh and Pompeii do not prove such knowledge, for the focus of these glasses is too short. Nevertheless we are tempted to assume such knowledge as essential to the minute and exquisite work of the ancients in gold and precious stones. The hollow globe filled with water may have served this purpose. It is certain that such a globe was used as a burning glass and it may have been part of the armamentarium of the ancient physician. The magnifying and heat-producing properties were, however, attributed to the water and it was a source of wonder that cold water could produce heat!

It is possible that the Saracen mathematician and astronomer, Alhazen (died 1038), had some idea of lenses as aids to vision. He wrote of refraction in reference to astronomical instruments. Roger Bacon probably was acquainted with Alhazen's work. The high state of scientific knowledge among the Arabians would make it seem likely that they were familiar with glasses, but we have no evidence to substantiate this surmise.

Professor Hirschberg has long been a staunch supporter of the theory that glasses are a European invention and that the Chinese, until modern times, used lenses only as mirrors and for kindling fire. The opposite theory is that missionaries returning to Europe from a journey to the orient brought back the knowledge of glasses. One of these missionaries was a friend of Roger Bacon and visited him on his return from his tour. Here is a link between Bacon, around whose name the discussion has centered, and his predecessors. Much speculation may be indulged in in regard to the communication between Europe and the Orient in medieval times and the possibilities of the origin of glasses in one and their spread to the other. One may say that the Chinese complacently claim the inventions of others as poor imitations of their own (a charge which perhaps is rather an evidence of Western egotism than of Oriental complacency). On the other hand, one might cite the instance of the mariner's compass and of gunpowder, called European inventions, whereas they were actually known earlier in the East. Unquestionably much of European culture can be traced to the Moors in Spain, to the crusades, the Oriental trade of the Venetians, and even possibly to the explorations of Marco Polo.

Whatever be the theories, we have historical data for the statement that glasses were known in China and in Europe in the thirteenth century. A Chinese historical document of the Mongolian Dynasty (1260-1367) states that old people used lenses to distinguish small print. Prisoners from Turkestan taught the Chinese the art of making these glasses; so valuable were they that a horse could be sold for a pair of glasses. In the fifteenth century glasses were imported from Malacca; but in the thirteenth century China was in close touch with other Asiatic peoples following the migration of the Mongolian tribes. The evidence in this matter we have received from the Orientalist, Dr. Berthold Laufer, of the Field Columbian Museum of Natural History in Chicago, and the documentary proof puts the use of glasses in the Orient at a date slightly earlier than that at which they are first mentioned in Europe. Laufer suggests that the culture relations of the Asiatic peoples of this period make it reasonable to attribute the source of glasses to India, whence they reached China through Turkestan. To this should be added the observation that Chinese glasses were of essentially different design from early European glasses, being large lenses, oval rather than round, with rims of tortoise shell and bows of brass or copper resting against the temples. European glasses of the thirteenth century, on the contrary, were nose glasses with circular lenses. Beginning with the early eighteenth century European glasses were imported into China and have since been the prevailing type.

Turning to the European evidence, we note that a definite claim is made in Italy where Armati is said to have invented glasses in 1285. On a tombstone in a Florentine church was found this inscription: "Here lies Salvino d'Armati of Florence, the inventor of spectacles. God forgive him his sins"; a pious wish which our patients no doubt would reiterate did they know that the good monk was accused, though falsely, of originating their misfortune! Opposed to the Italian claim is circumstantial evidence in favor of Roger Bacon. The name of this English monk-Philosopher looms large in many matters of scientific concern at this period. So great was his learning and so extensive the range of his subjects treated in his writings that he has gained credit for numerous inventions. Bacon's great work, the Opus Majus (1268), antedates the supposed invention of Armati by seventeen years. This work treats of the science of optics. Bacon made drawings of biconvex lenses; he was acquainted with the shape of the crystalline lens of the eye; he advised the use of lenses by the old and those who have weak eyes for the purpose of magnifying objects viewed. Bacon's knowledge may have been taken to Italy by a member of his ecclesiastical order who was detained for a long time in Florence while on a journey to intercede with the Pope in behalf of his order.

With characteristic conservatism, clergy and medical profession condemned the new remedial agency. Bernard Gordon, professor in Montpelier, was the first to mention glasses, which he declared to be unnecessary if his famous eye remedies were used. Guy de Chauliac, physician to several popes, recommended glasses only when his own eye lotion did not first effect a cure. The church authorities considered that the Almighty had a purpose in inflicting poor sight on the aged, else He would not have done it: and to interfere was impious. Therefore Bacon received no encouragement to seek publicity for the new device which he knew, whether or not his knowledge was original; moreover he had distinct cause for discouragement since he had already been imprisoned for dealing in "black magic," and safety depended upon avoiding conflict with the church.

To summarize, we may say that the inventor of glasses is unknown; the nations of antiquity probably knew nothing of these instruments; the ancient classics are devoid of mention of glasses. Alhazen seems to have made no practical use of his knowledge of optics. Near the end of the thirteenth century convex spherical lenses came into use in China and in Europe. It is probable that neither obtained their knowledge from the other. European evidence favors the view that Roger Bacon made glasses independently of Chinese influence or discovered the invention of some learned predecessor.

At first glasses were designed for the correction of presbyopia, the strongest lenses being +3.00 spheres. They were plano-convex or weakly concave on one side. They seem to have been first used as the modern hand glass held close to the object viewed and only gradually were methods devised to secure the glasses before the eyes. The European glasses were essentially eyeglasses and not spectacles; they consisted of one, or two, lenses surrounded by heavy rims. Greef thinks that the eyeglass with two lenses preceded and that the monocle followed as an affectation. The rims, of various metals, or of leather, were joined by a solid bar or bow; these might rest against the nose but were insecure and must be held by the wearer's hand. For convenience handles were attached so that the hand rested at the chin or on the forehead; one model has a branched handle attached to both rims and joined below the chin; another was attached to the wearer's cap. Cords were tied about the ears or suspended over the ears.

The oldest pair of glasses in preservation are in the Nuremberg Museum to which they were donated by the antiquarian. Jacques Rosenthal of Munich, who found them in an old volume of the latter part of the fifteenth century. These are of the primitive type of round rimmed eyeglasses with a solid bow joining the rims. They are made of leather, partly of natural color and partly black. The lenses are lacking. The frames are larger and thicker, and therefore thought to be older, than the interesting glasses of Wilbrand Perkheimer (1470-1530), also in the Nuremberg Museum. When Perkheimer's house was torn down in 1867 and removed to Wartburg, where it remains as a memorial to the worthy burgomaster who was a friend of Martin Luther and Albrecht Durer, an ancient pair of glasses was found in a cranny of the wall, where they no doubt fell from the wainscoting on which the old man placed them when he laid aside his reading. They are of leather polished black on the front surface. These glasses, like the older pair described, are the common type seen in the pictures and tapestries of the middle ages.

Most instructive and interesting are the anachronisms in the art of that time. Men of learning and dignity were portrayed with glasses in their hands or before their eyes. As Shakespeare ignored the inconsistency of placing the inventions of his own day in the scenes of historical plays representing more primitive times, so the medieval artists did honor to their historical characters by furnishing them with glasses. A favorite honor to the donor of a picture painted for a church was to include the donor's portrait in one corner of the canvas, indicating his high position in the intellectual world by painting a pair of glasses on his person. But the donor was not the only favored one. Even so far back as the Garden of Eden do we find these aids to vision, as shown in the Spanish tapestry called the Creation of Eve, in which an aged priest sits reading with eyeglasses on his nose. In the collection of the late Benjamin Altman of New York City is a painting entitled Bathsheba After the Bath, in which an old serving woman wears glasses. This is an unusual conception of the artist, for only the characters who are held to be persons of exceptional importance are ordinarily pictured with glasses. The Circumcision of Christ exhibits a pair of glasses worn by the High Priest. The Death of the Virgin presents another such anachronism; an apostle is wearing nose glasses. A beautiful painting whose style suggests Leonardo da Vinci shows the infant Jesus in his mother's arms holding a pair of glasses which may be supposed to belong to his father, Joseph, the elderly man in the background. Saint Jerome, patron saint of the optician's guilds, is usually represented with glasses.

From the first crude eyeglasses advancements were gradually made in the succeeding centuries. In place of the solid bow was substituted a jointed band of metal, allowing the lenses to be separated or drawn together according to the width of the nose, and so to clasp the nose with additional security. Of further convenience was a hinge joint in the connecting bow allowing the lenses to be folded one over the other so as to fit into a small case. Iron, silver, gold, wood, bone, ivory, horn and leather were used for frames. These were of natural color or polished, and sometimes highly ornamented by carving and filligree work. But few of the early lenses have been preserved, the old frames to be seen in the museums usually being devoid of lenses. They were made of rock crystal, topaz, emerald, in fact, any fairly transparent stone. A variety of such stones were formerly termed beryl, a word which appears in many languages (Latin "berillus," French "bericle," German "parille" and later "brille").

Greeff of Berlin has depicted the evolution of glasses from the earliest European types of rimmed eyeglasses with a heavy inflexible bar to the modern graceful and comfortable devices. The chief need at first was some means of fixing the glasses on the nose. First a nail united the two halves of the iron connecting rod, allowing a little motion. This type was the prevalent one in the fourteenth century. Later more elastic materials were substituted until something comparable to the spring of the modern eyeglass was invented. From a type with two long handles, one attached to each rim and joined below, was evolved the French binocle and finally the modern lorgnette (19th century).

Naturally grosser hyperopic defects soon received relief after the first era of the use of glasses for presbyopia alone. Not until the early sixteenth century, however, did concave lenses for the correction of myopia come into use. The earliest picture showing them is the portrait of Pope Leo X by Raphael (1517) in the Palazzo Pitti in Florence. The concavity of the lens is well shown by the reflex. It is related that Leo X was a successful huntsman and boasted of seeing better than his companions despite his nearsightedness.

At first the clergy made glasses, but this industry, like many others in the middle ages, came under the control of the guild system. As early as 1465 the Spectacle Makers' Guild took part in a review of merchants and craftsmen before the French king. This organization survived until abolished by the French government in 1785. Mention is made of the Spectacle Makers' Guild in England in 1563, and several charters were granted to opticians by Charles I. and Charles II. When the guild system came to an end peddlers became the chief source of glasses for the general public. They traveled through the land selling their imperfect wares to those who might select convex or concave lenses for the grosser defects of presbyopia, hyperopia or myopia. It was only in the later years of the seventeenth century in Europe and the beginning of the eighteenth century in America that opticians' stores became numerous. When the medical profession finally gave scientific concern to refraction opticians found opportunity for the exercise of their vocation. But a few well known firms of olden times are worthy of mention, notably those of Nuremberg, which interesting city now contains the most valuable collection of old glasses. Here worked successive generations of opticians whose names are preserved on copper plates from which their letter heads and advertisements were made. The famous Schmidt family have been opticians in Nuremberg from 1634 to the present time. Paul Belgrad, Paul Egrad, Gottlieb Schaab, and Hermann Gunt are among the names associated, during the eighteenth and nineteenth centuries, with the optical industry in Nuremberg.

Conditions of life previous to the eighteenth century rendered the use of glasses unnecessary to the majority of individuals and their costliness was frequently prohibitive. The ability to read and write was the possession of the learned few and no adequate appreciation of optical principles had arisen save in the minds of a few scientists following Kepler's observations (1604). Glasses were highly valued by their wealthy possessors. In 1379 the will of Charles V. of France bequeathed two pairs of glasses, one with black horn rims and a wooden handle, one of gold with a large silver case weighing ten pounds. Frederick the Great is said to have had Hieronymus Meyer come to Frankfort to make him a pair of glasses. Napoleon I. had a binocle of mother of pearl with branches of gold, the lenses being made of rock crystal. The cases for many of these old glasses were highly ornamented and expensive productions. The remarkably complete and rare collection of Madam Heyman of Paris shows these artistic cases and the costly glasses which they were designed to contain.

Such luxuries were caricatured in France at the time of the Directorate and in England by the famous Hogarth. Physicians knew little of optics and regarded the prescribing of glasses as beneath their dignity. The famous German ophthalmologist. George Bartisch. in his text-book published in 1583, condemned their use severely. Von Arlt, in the nineteenth century. was the first ophthalmologist of note to pay due attention to glasses as a valuable addition to the therapeutic armamentarium of the physician.

Excepting Chinese glasses, it is to be noted that. although the terms "spectacles" and "spectacle makers" were used in earlier times. it was not until the eighteenth century that spectacles in the modern sense of the word, as opposed to eyeglasses, were devised. Through transition forms the comfortable and secure spectacles of today can be traced, and only quite recently have eyeglasses attained any such degree of perfection with the aid of clever mechanical contrivances. Thus the sequence is seen to be: crude eyeglasses, transition forms. crude spectacles. perfected spectacles, perfected eyeglasses.

In 1746 the optician Thomin of Paris advertised glasses which "allow free breathing." In 1752 Ayscough. a London optician, made spectacles. The first models had short temples ending in a plate or ring in front of the ears; next the temples reached behind the ears pressing against the occiput, or were united by threads tied behind the occiput; next a joint was added with a short piece of metal extending from the horizontal temple down back of the ear. This vertical piece was also curved conforming to the contour of the ear. Straight temples continued in favor until very recent times and are used today by a few individuals, although the solid temple of one piece sufficiently flexible to allow adjustment to the contour of the ear has largely superseded all the older models.

An important function of glasses has long been that of protecting the eyes from excessive light. How far into antiquity this conception goes we do not know; but primitive tribes in various parts of the world devised protective goggles before contact with civilization brought knowledge of glass. The Eskimo have long used wooden goggles hollowed out to fit over the eyes and attached behind the head by strings of leather or sinew. Small round holes or slits served to admit a minimum of light while the back surface of the wood was darkened with smoke, black paint or graphite. More light and graceful is the model consisting of two small wooden trays united by a broad band of dressed hide, rawhide strings fastening the whole to the head. The extensive collection in the Smithsonian Institute in Washington shows these and other varieties and improvements marking the contact of the Eskimo with civilization. Among the Chinese a sort of visor, like the peak of a jockey's cap, has been used as well as goggles. From Tibet come eye shades made of finely woven horse-hair and of silk with the ends sewed into bits of embroidered flannel to tie behind the head. A similar Tibetan device is to be seen in the Field Columbian Museum of Natural History in Chicago. This protective shade is identical in shape with the present-day automobile goggles. The drivers of dog sledges in Siberia wear tin protectors with minute perforations to admit light.

Such primitive means of escaping the discomfort and harm of glaring light reflected from snow, sand, and water gradually have given way to spectacles containing tinted lenses. Colored glass was made by the ancients; but only in the seventeenth century, in Venice were transparent colored lenses used for protection against glare. These were of green and blue tints. Later the smoked glass was originated in England, the yellow in France, and in America several colors have become popular, chiefly the yellow-green (euphos), the amber, amethyst, and the green called "chlorophyll," with which we are all familiar. Each of these tints has been warmly advocated on the theory that it alone is impervious to certain essentially harmful light rays (as the ultra-violet). It is perhaps more correct to say that the virtue of all tinted lenses consists merely in shutting out an excess of light.

Out of the use of minute openings, round and slit-like, in opaque protecting devices before the eyes probably grew the observation that vision might be improved by the stenopeic slit. It has long been known that myopes see better by producing, through the partial closure of the palpebral fissure ("squinting"), a stenopeic slit between the lids. "Del Duello," published in Venice in 1551, recognizes and allows a slit-like opening in the visor for myopes in dueling and in battle. Masks were utilized in the treatment of strabismus for the purpose of forcing the faulty eye to assume a normal position in looking through the small aperture, the location of the aperture varying according as the strabismus was convergent or divergent. Such a mask was used by Ambrose Paré in 1575, and the device is pictured in Bartisch's famous text-book in 1583. Deformed pupils, scarred corneas, nyctalopia, and albinism are mentioned as conditions calling for the mask. These minor uses of small apertures for vision naturally disappeared with the advent of lenses for both visual and protective purposes.

Coming to the later years of the eighteenth and the beginning of the nineteenth century, we enter upon an era of steady progress in the optical industry leading up to the recent period of tremendous progress. In 1784 Benjamin Franklin conceived the idea of bifocal glasses. The purpose and result of this exceedingly convenient device cannot be indicated better than in his own simple statement which he made in a letter to a friend: "I had two pairs of spectacles that I used alternately because when traveling sometimes I passed the time in reading, sometimes in looking at the country. The change from one pair to another was troublesome and often was not effected soon enough to allow me to see what I wanted. So I had my glasses cut in two halves, one half of each being put in the same frame. In this way I wear my glasses constantly, and I have only to look through the upper or through the lower part in order to see distinctly far distant objects or near objects."

Many changes have since been made in the bifocal. The upper and lower lenses have been separated by a shell rim; the lower lens has been tilted in at the bottom to occupy a better position in reading; a small segment of the upper lens has been cut out and the reading glass inserted in its place with cement, and later fitted into a groove in the upper lens. Trifocal glasses were invented by John Isaac Hawkins of London in 1826, and Beetle of Lyons patented a device for placing four lenses of different strengths in one frame. It has not been found practical, however, to use more than two strengths of glass in one frame, and the genius of inventors has been expended upon improving the bifocal. As early as 1836 the effort was made to obtain with one piece of glass the double focus required for near and far seeing. I. Schuster accomplished this by grinding off a small portion of the reading lens to give distant vision. Numerous opticians in England and America followed this plan, until eventually we find the exquisite pieces of workmanship now sold under the names of Kryptok and One-Piece Bifocal.

The disadvantage of crude bifocals was that they did not admit of comfort in walking. To obviate this difficulty auxiliary lenses were attached to the frames so as to be withdrawn from the field of vision when the wearer wished to see distant objects only, and to be swung into place when he wished to see nearby. Of the numerous models devised, all consist essentially of a short arm pivoted to the temple, bridge, or rim. None of these has attained popularity. Of more frequent use are the "grab-backs" and "grab-fronts" which hook over the end pieces of the temples either behind or in front of the distant glasses. These have the disadvantage of scratching the lenses through the contact of two lenses, one, and often both, of which are convex. The most practical bifocal of the two-piece variety and the one commonly used has the presbyopic correction made by a small segment cemented with balsam to the lower part of the distance glass. This originated with Samuel Gregg in 1866 and was re-invented by several other opticians.

In the early nineteenth century a great advance was made in the application of lenses to the correction of errors of refraction when the English scientist, Thomas Young, demonstrated the condition of astigmatism (1801). Sir George Airy was the first individual to receive the benefit of the correction of his astigmatism which he worked out himself, and for which the optician Fuller of Ipswich, England, furnished glasses in 1827. The optician McAllister of Philadelphia ground cylindrical lenses in 1829, and it is believed that Zentmayer of Philadelphia was the first in America to grind sphero-cylinders, as he was the first optician to limit his business to the filling of physicians' prescriptions for glasses. When the factor of eye-strain based upon astigmatism received due appreciation the making of glasses rapidly became an important industry ministering to the needs of thousands who were unconcerned with the optician's art when it applied only to the aged and the grossly far-sighted and near-sighted individual.

From the time of Roger Bacon to the latter half of the nineteenth century the evolution of the history of glasses was slow consistently with the civilization of this period. So long as transportation was difficult and dangerous, books cumbersome and few, education limited to the minority of men and denied altogether to women, and life largely rural with few occupations requiring prolonged use of the eyes at close range, the world in general endured what eye defects nature had inflicted and the fifth decade of life brought the failing of near vision which was accepted along with gray hairs and toothlessness. Johann Kepler's demonstration of the principles of optics was of scientific interest: but the medical profession awaited the ophthalmoscope of Helmholz (1851), the classic work of Donders (1864), and pharmacology's gift of cycloplegic drugs before an accurate refraction and proof of the value of glasses in the relief of eye-strain incident to modern conditions of life could be secured. These veritable boons to mankind have relieved suffering, prolonged years of usefulness, forestalled disaster to the entire organism as well as the ocular apparatus, and added to the sum total of human happiness to a degree which it taxes the imagination to conceive.

The numerous inventions of recent years are familiar to us in so far as they have become practical in every day use, but there is much to be sifted from the mass of ever-increasing devices for obviating disadvantages and securing neatness in glasses.

The subjects of "invisable bifocals," toric lenses, the legion of eyeglass mountings patented in America within the past two decades, and the fads like shell-rimmed spectacles (a reversion of type, going back to medieval France), would exceed the limits of one article.

REPORTS OF SOCIETIES

JOINT MEETING OF THE CHICAGO MEDICAL SOCIETY AND CHICAGO OPHTHALMOLOGICAL SOCIETY HELD MAY 13, 1914.

Dr. W. H. Peck, President of the Chicago Ophthalmological Society, in the Chair.

There was a symposium on The Prevention of Blindness.

Dr. Frank Allport read a paper on "Conservation of Vision," in which he said that societies for the conservation of vision have been formed in various portions of the United States. In Pennsylvania, Indiana, Missouri, etc., the organization exists as a Committee of the State Medical Society; in New York, Illinois, etc., independent associations have been formed; in Ohio the "Commission," as it is called, is a part of the State Government. There is also a National Association, independent in its nature, and mixed in its membership. Some of these Associations, such as New York, Massachusetts, Maryland, Ohio, etc., are doing energetic work, while others are inactive and almost useless.

At the 1913 meeting of the American Medical Association the Council on Health and Public Instruction appointed a committee on Conservation of Vision, of which the speaker was appointed Chairman. The object of this committee was to produce interest and action in conserving vision, and endeavor to concentrate under the auspices of the American Medical Association activities calculated to preserve the sight of this and coming generations. The Council on Health and Public Instruction sends out each week a sheet called The Press Bulletin. This is sent free to nearly six thousand newspapers, and the printed matter upon its face can be used by the papers as editorials, news matter, etc. This printed matter consists of short, plainly written articles on health topics. They are unsigned. The Council also employs clipping bureaus, and through them it is ascertained that these articles are very extensively used, and are shaping public thought along medical lines in this country.

The next work of the committee was to write, print and circulate twenty pamphlets on popular eye topics. They are for sale at five cents a copy, but are also freely given away on proper application. Sets of these pamphlets have been sent to public libraries, women's clubs, teachers' institutes, State Legislatures, health boards, etc., all over the United States.

A lecture bureau manager was appointed in each State, who was willing to superintend the work in his State. Where a State organization for conservation of vision existed, one of its officers was selected to carry on the work, but where no such organization existed, a prominent, energetic and willing oculist was selected. This "State Manager," as he was called, was to enlist the assistance of all the oculists he could, acting, wherever possible, in harmony with local and state medical societies, both ophthalmological and general. In order to make these lectures easy to deliver, the committee prepared a box of about thirty colored and uncolored stereopticon slides and sent them to each State Manager, to be loaned to his associates in the work, whenever a lecture was to be delivered. In addition to this a pamphlet was prepared, entitled "A Plan of Campaign for the Conservation of Vision." A kind of skeleton lecture was included in it, suggesting subjects, etc., to be referred to in lecturing. Each lecturer was also placed on the mailing list for the Press Bulletin, and also received a complete set of the "Conservation of Vision Pamphlets." Quantities of the Vision Charts for Schools were also sent into each State. While these lectures were intended to cover all avenues of vision conservation, it was especially hoped that it would result in the use of the Crédé treatment of the eyes of all new-born babes; in the lessening of shop accidents; and in the annual and systematic examination of all school-children's eyes by school-teachers; for it is reasonably certain that if these three procedures could be universally adopted, eighty per cent. of all blindness could be eliminated from this country. The establishment of measures referred to above could be accomplished at an annual cost which would not exceed $250,000. It costs $15,000,000 a year to care for the dependent blind in this country alone, to say nothing of those children more or less incapacitated by defective or diseased ears, noses and throats.

Emphasis should be laid on several points connected with the annual systematic examinations of school-children's eyes, etc., by school-teachers. *First*, the examinations are simple and require no medical education. *Second*, teachers are not expected to make diagnoses. They merely ascertain the fact through the questions that something is wrong, and leave the rest to the doctor selected by the family for consultation.

Third, a child can be easily examined in five minutes and each teacher should examine the children attending her own room. By subdividing the work in this way, all the children in any city of any size can be easily examined in one day—a definite day—in the early Fall—of each year should be set aside for these tests in all cities. *Fourth,* these tests not only benefit the children by leading to the correction of their eye, ear, nose and throat defects, but the correction of these defects benefits the teachers because such corrections usually add materially to the intellectual and moral character of the children, thus rendering them much easier to teach, and more pliable to discipline. Teachers should, therefore, be glad to do this work. *Fifth,* there is no objection to these examinations being made by doctors or school nurses. This, however, would cost large sums of money and Boards of Education and Health are never allowed enough money for even ordinary purposes.

As to the future of the work, he would recommend:

1. The continuance of a weekly article on the eye for the Press Bulletin of the Council on Health and Public Instruction.

2. A few more Conservation of Vision Pamphlets on interesting subjects and the increased circulation of these pamphlets.

3. The continuation of the Conservation of Vision lectures in the various States. Many more of these lectures should be delivered, and the State Managers should be changed, where the present Managers have not shown a reasonable interest in the work. From twenty to twenty-five new slides for the stereopticon should be made, that will more fully illustrate the subject.

He would also recommend that the work of the committee be extended, so that it shall become a potent power in the community. It should have a central office, with a paid, interested, intelligent, energetic secretary, who could and would from time to time journey from State to State, upon request, and assist in the formation and perpetuation of State societies for the conservation of vision. His travelling expenses should be paid by those who summon him to the various localities. He should have a well equipped office, with one or two stenographers, and a library and files, containing *everything* that is printed on the subject of conservation of vision. This office should be recognized as a Central Bureau of assistance, advice, literature, laws, etc., where all questions concerning this subject can be intelligently and willingly answered. The work of such an office would be enormous and its influence widespread. But to do this considerable money would be absolutely necessary, and he would therefore, recommend that this money should be forthcoming from some source, and that the good work be encouraged to go on. He would also advise the distribution in all schools of crisply and plainly written leaflets concerning the care of eyes, ears, noses and throats. These should be taken home, so that the parents could read them. They should be printed in various languages. Perhaps even a better plan would be to have suggestions of this kind printed on the blank fly-leaf of all school-books. This would cost almost nothing extra, and the benefits to be derived would be incalculable.

Dr. Richard J. Tivnen presented a paper, illustrated by stereopticon, on "Blindness Due to Ophthalmia Neonatorum."

An extended review of the subject was given and numerous tables shown illustrating the prevalence of Ophthalmia Neonatorum, the proportion of the disease in relation to blindness from all causes, and the proportion of blindness caused by Ophthalmia Neonatorum. From these conclusions were drawn that 1/8 of blindness from all causes is due to this disease, and 1/4 of the blindness among children is attributable to the same cause.

A comparison of the cases of Ophthalmia Neonatorum to all diseases of the eye showed:

1.—Illinois Charitable Eye & Ear Infirmary, Chicago	1.30%
2.—Massachusetts Charitable Eye & Ear Infirmary, Boston	1.04%
3.—Manhattan Eye, Ear & Throat Hospital, New York	0.3 %
4.—New York Eye & Ear Infirmary, New York	0.08%

A comparative table showing blindness caused by Ophthalmia Neonatorum showed:

	Cases.	*Per Cent.*
Magnus' Table—of 2,528 cases of blindness in Germany, Ophthalmia Neonatorum caused blindness in	275	10.876
Trousseau's Table—of 625 cases of blindness in France, Ophthalmia Neonatorum caused blindness in	29	4.60

Oppenheimer's Table—of 572 cases of blindness in the United States Ophthalmia Neonatorum caused blindness in.......	18	3.10

The census returns from England and Wales (1901) showed 1/3 of the cases of "Blind from Childhood" were blinded by Ophthalmia Neonatorum, approximately 1,500. Causes of blindness in London School Children (based on 362 cases) showed Ophthalmia Neonatorum to be the most frequent cause of blindness, with a percentage of 36.36. Other statistics gathered by various workers showed percentage of blindness produced by Ophthalmia Neonatorum are as follows:

	Per Cent.
Reinhard—Germany, Austria, Denmark, Holland........	40
Claisse—Paris	46
Magnus—Breslau	34
Katz—Berlin	41

The "Special Reports on the Blind and Deaf (1901), United States Census" showed 2,556 lost sight after birth but under 1 year of age, and in 644 or 25.2 per cent of these cases the cause of blindness was probably Ophthalmia Neonatorum."

The New York Association for the Blind in a pamphlet on this subject states:

"The official census of New York state (year 1906) gives a total of 6,200 blind persons in the state. Ten per cent of the blindness (or 620 blind persons) was due to Ophthalmia Neonatorum."

The same observers present tables from 11 schools of the blind throughout the United States and Ontario, showing the proportion of children admitted during the year 1907 who had lost their sight from Ophthalmia Neonatorum. These percentages show a maximum of 50% and a minimum of 12.50% of cases who had lost their sight from this disease.

A reference to the activity of midwives and obstetric practice showed that "in Chicago, in 1904, 86 per cent of all births, principally among Italians, were reported by midwives. In Buffalo, nearly one-half of the births, in one year, were attended by midwives. In New York City, in 1905, 43,834 births, or 42 per cent of the whole number, were attended by midwives. For the year 1907, in New York City, there were 68,186 births reported by physicians, and 52,536 reported by midwives. In September, 1908, the registered midwives in the five Boroughs of New York City numbered 1,382."

The author of these reports well concludes: "In the face of these figures it is idle to talk of the elimination of the midwife."

The essayist touched on the economic side of the question, stating that it costs the state $3,000 to educate a blind child, and referring also in this connection to the cost of the equipment and maintenance of blind schools and the loss in the earning capacity of the individual and the curtailing of "avenues of opportunity" which the blindness imposes.

A consideration of the etiology, pathology, and clinical course and treatment of the disease was presented and a plea made for a more general use of Crede's method of prophylaxis. The essayist also made known the plan which the Committee of the Chicago Ophthalmological Society is inaugurating to aid in the prevention of infections due to Ophthalmia Neonatorum. In brief, it was the plan described by the New York Association for the Blind and was designed to follow three general lines.

1. Educational;
2. Legislative;
3. Co-operative.

Educational.—Through the preparation, publication and dissemination of printed matter, emanating from the Committee or approved by it; through public lectures, addresses and exhibits; and by means of the press—upon whose generous assistance the Committee greatly relies.

The object sought is to spread among the general public the knowledge that Infant Ophthalmia is a dangerous, infectious disease, fatal to sight unless checked at the time of the birth of the child, easily preventable then if simple precautions are taken; to inform parents, more especially, of the dangers which threaten the sight of their children at birth, and the preventive measures which should be taken; and to advocate the universal adoption of such measures.

Legislation.—To promote such legislation as may be needed to accomplish the object in view—the prevention of the unnecessary blindness of infants.

Co-operation.—In furtherance of the same object, the Committee seeks and invites co-operation with Medical Societies, Health Officers, Ophthalmic, Maternity and other hospitals in which children are born, Dispensaries, City Missions, Settlements; with Schools, Institutions and Associations for the Blind, and with all Societies engaged in work for children and for social betterment; with District Visiting Nurses, and with all persons who are already engaged in this work or who desire to help in it."

The Cost of Blindness to the State.

Dr. Thomas Woodruff said that much of the blindness of the world is due to causes that are easily preventable, and this can be done at a cost that is small compared with what is needed to educate and care for those who have been deprived of sight. Any individual who through some cause or other has his sight destroyed has his earning power absolutely taken from him. He must become dependent upon outside aid for his future maintenance, and the community loses an asset consequent upon his withdrawal from productive activity. If the blindness occurs in early childhood, the greater the cost to the State. The blind child must be educated in schools specially provided, special teachers are required, and the cost is proportionately higher than in schools where the seeing child receives instruction.

The State of Illinois pays out approximately $100,000 a year for the education and maintenance of the blind under its immediate care.

The cost of maintenance, to the United States, of the dependent blind is about $10,000, per capita, through life. It costs this country all of $25,000,000 a year in taking care of the blind. Then there is the matter of unemployment and reduced earning capacity. The average wage of those of the blind men who are employed is $7.00 a week; that of the women, about $3.00 a week. There is no definite data as to the number of blind employed.

Now, as to the cost of preventing unnecessary blindness, and a conservative estimate places the number of cases of preventable blindness at about forty per cent. of the total number: The cost to the community consists of cost of treatment at the onset of the disease; cost of educating the blind; and cost of maintenance, and added to this is the loss occasioned by unemployment as well as reduced earning capacity of the one afflicted.

The cost of treatment is difficult to estimate, as can readily be seen, but this is the smallest item.

As to cost of prevention, let us take the most frequent and most potent cause, as well as the most preventable and most unnecessary form of blindness—ophthalmia neonatorum.

A one per cent. solution of nitrate of silver instilled into the eye at birth is a sure preventive. Nitrate of silver is cheap; add to it the cost of containers and expense of distribution, and we can save babies' eyes at the rate of two for a cent. Compare this insignificant sum with the cost of blindness. It would cost twenty-five thousand dollars a year to save the eyesight of the two million babies born each year in this country, as against the twenty-five million dollars to educate and maintain those who have lost their eyesight through carelessness and neglect.

What the State Can Do to Prevent Blindness.

Dr. Willis O. Nance said that it is a shame that the example set by Illinois five decades ago in establishing an institution having for its object the worthy aim of preventing its indigent citizens from becoming blind or deaf has not been followed by other commonwealths, except in a very few instances. The number of citizens who owe their useful vision to the care of this institution must number in the thousands.

Illinois, for more than a decade, has had a law on its statute books requiring that midwives report within twenty-four hours all cases of "babies' sore eyes." The penalty for non-compliance with the provisions of this statute is a maximum fine of $100 or six months' imprisonment, or both It is possible that the existence of this law has been the means of saving some infants' eyes, but every oculist in Chicago knows that the statute is not enforced to the extent that it should be.

Chicago has an ordinance requiring that physicians, midwives, or other attendants, report every case of ophthalmia neonatorum to the Department of Health within twenty-four hours after its occurrence.

Strict enforcement of these two laws would, Dr. Nance believes, accomplish much in the prevention of blindness in our community.

The State might also with propriety go back even farther than the conscientious enforcement of the midwife notification law. It might with decided advantage make much higher the requirements for the practice of midwifery in Illinois. It might also require that midwives employ the Credé prophylactic method at every birth, as is done in some States.

The Chicago ordinance requiring that all cases of ophthalmia neonatorum be reported to the Health Department might well be made a State law. State legislation requiring report of all births, with the information as to whether prophylactic drops were employed or not, and, "if not, why?" might well be adopted. It might be well to have printed instructions for the care of babies' eyes, printed, as occasion demanded, in various languages, circulated in the homes.

Free distribution of nitrate of silver drops by the State should be encouraged. In at least one State, the speaker has been told, these ampoules of silver are sent to every practicing physician and midwife, irrespective of request. They are inexpensive and a comparatively small appropriation is necessary to provide every person who performs obstetrical work with them.

Ample hospital service for the treatment of cases of ophthalmia occurring among the needy should be provided by the State. Illinois, through her state infirmary, has done better for these cases than have most of the States of the Union. Yet she could go even farther by training in her institutions more nurses who would be competent to properly handle such cases. A training-school for nurses with a course extending over a period of several weeks or months might well be established and maintained at the state infirmary in this city.

Trachoma, responsible for about one-tenth of all blindness in Illinois, must also be reckoned with by the State. This means more adequate enforcement of laws affecting the sanitation of houses, institutions, etc. The ordinance prohibiting the common towel in public places, passed by the Chicago City Council at the instance of the speaker, might with equal value be made effective throughout the State.

Ocular injuries are responsible for perhaps five per cent. of blindness. The greater number of these injuries are preventable, many of them being due to carelessness and ignorance.

The explosive golf-ball has entered the realm of sight-destroyers to quite an extent the past few years.

Industrial injuries do not seem to be occurring with the same degree of frequency that they did in the past. Manufacturers and railroad officials are furnishing much better means of protection for their employees than formerly. In this connection, however, the State might well attempt to prevent the removal of foreign bodies from the eye of workmen and others by non-medical men. Every oculist of experience has seen the dire results following this practice.

Wood alcohol blindness has become of sufficiently frequent occurrence to demand better regulation of its use in industrial pursuits and in its sale to the public.

The State can accomplish much in preventing defective vision and blindness on the part of its citizens by improvement in the school system, so far as it relates to the illumination of school-rooms, the size and position of desks and seats, the size and character of the print of books, the kind of paper used, etc. The State might with prudent propriety demand that school superintendents, principals and even teachers have some knowledge of physiologic optics, the effects of poor illumination, etc., before they are permitted to qualify for their positions under the law. The State can do much to prevent blindness, but it cannot be expected to shoulder the entire work and responsibility. Through its various institutions and officials it can do much to spread the gospel of education—a decidedly potent factor in the propaganda we are promoting, especially at this meeting. Through its law-making bodies and executive departments it can assist materially.

There was no discussion on the symposium, and the meeting adjourned. PAUL GUILFORD, Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

A regular meeting was held April 20, 1914, with the President, Dr. Wesley Hamilton Peck, in the Chair.

On motion, duly seconded, the resignations of Drs. F. A. Phillips and E. R. Lewis were accepted.

Dr. George F. Suker read a letter from the General Electric Engineering Co., of Cleveland, offering a scholarship in ophthalmology to someone interested in the subject.

On motion a committee was appointed to recommend suitable candidates for the position. The committee was named by the President as follows: Dr. H. S. Gradle, Chairman, Drs. Suker and Albro.

The application of Dr. Frederick D. Vreeland was referred to Dr. H. W. Woodworth, Chairman of the Membership Committee.

Dr. M. H. Lebensohn presented a case of glaucoma, concerning which he read a paper entitled:

"Glaucoma Following Cataract Extraction."

Mr. Geo. T., age 53, was admitted to the Illinois Charitable Eye & Ear Infirmary June 15, 1913, with a history of failing vision in the left eye 9 or 10 years and the right eye 5 years. Diagnosis, right eye immature cataract, left eye, mature senile cataract; pupil of left eye reacted normally, perception and projection good. On June 23 an iridectomy of left eye, about 5-6 mm. wide was performed, with little reaction following. July 15 vision 1/200 with a +11.00, 20/40. There was a very thin capsule in the pupillary area. He was needled July 22. July 25 with a +11.50 he had vision of 20/20 +2 or 3, and that was the lens prescribed for him. The tension came down, and the patient became comfortable again. About the end of November the tension was taken with a tonometer, and it varied from 29 to 40, at one time going as high as 44. Eserine sulphate and pilocarpin seemed to have little effect. February 2, 1914, the tension was 53½ and a scleral trephining was done below, and a peripheral iridectomy. Twenty-four hours after there was a moderate ciliary injection and the wound drained nicely. February 6 ciliary injection almost entirely gone, wound well drained and no pain. February 14 vision in left eye 20/40. February 18 the patient could not see the electric lights in his room, and vision was reduced to fingers about ten inches. Examination showed large brownish mass in upper temporal side. Diagnosis was made of detached choroid. The patient put to bed, eye bandaged, light diet ordered and dionin used in eye. There was no pain and after ten days the re-attachment was complete, with vision of 20/30. In two weeks it was 20/20+3 and now it is about 20/15 with tension normal.

Dr. Lebensohn said it would be interesting to have statistics of cases of trephining without iridectomy so as to know whether detachment ever follows that operation.

Eye Diseases and Autointoxication.

Dr. Clark W. Hawley stated that many eye diseases are cleared up by a urinalysis, showing that the system is absorbing toxins from the lower bowel. It is here the waste products are stored, and if not properly eliminated they are absorbed into the circulation. The uveal tract of the eye, on account of its exceeding vascularity is a very good stopping point for any wandering toxic material, and thus we have iritis, cyclitis, choroiditis and other inflammatory manifestations.

The diagnosis is made through a very careful analysis, there being two main abnormal conditions which must be taken into consideration, first, acidemia, and second, evidence of poisonous extractives present, as indican, indol and skatol.

The treatment consists in a most thorough cleaning out of the lower bowel at regular intervals. Treat the acidemia with some form of alkali and regulate amount of water taken. As to medicine, use some form of iodine along with cathartics. For flushing out the lower bowel use three pints to two quarts of water at 110° F., and in some cases a second flushing immediately follows with the temperature at 120° F. A tablespoonful of salt is added each time, and the time allowed should be from ten minutes to a half hour. Place the patient in the knee-chest position.

Dr. Hawley reported the case of Mrs. M., May 5, 1913, who complained that her glasses needed changing. The vision of the right eye was 6/18 and the left eye 6/12, no glasses improving the vision. On examination choroidal disease about the macula was discovered. The most painstaking care on the part of the patient in following instructions resulted in a very satisfactory improvement. The charts exhibited by Dr. Hawley showed an increase in amount of urine passed, a decrease in specific gravity and acidity. By October 6th all the conditions were vastly improved, which continued until February 25th, when the extractives appear again due to a partial meat diet. The choroidal disease was arrested and the vision improved two lines. The mental and general bodily condition have also markedly improved.

Dr. M. had had recurring attacks of iritis, an analysis of his urine showing high acidemia and indican present. Dr. Hawley at once put him on the proper diet and treatment, since which time he has had but one attack, and that brought on by not following the prescribed diet.

Dr. Hawley stated that in 1910 he was suffering from apparent chronic cyclitis. A urinalysis disclosed a severe case of autointoxication. After treatment for two months the opacities in his eyes, from which he had suffered, had nearly disappeared. The uveal tract, when once involved, is very sensitive, as is evidenced by the fact that the opacities reappeared after Dr. Hawley had been eating cheese at meals for about a month. After discontinuing the cheese the opacities disappeared after two months. The same old opacities appeared after eating a moderate proteid diet for two months, another evidence that the rule must be followed. He again began treatment, and at this time the opacities are hardly perceptible.

Dr. Hawley said that it had been stated that constipation is caused by bowel flushing, but his experience had disproved this as to himself and a number of patients. One patient's severe constipation was entirely removed.

In concluding Dr. Hawley stated that in every case that he had suspected autointoxication to be the cause of the eye symptoms, with the cooperation of the patient, success had followed the treatment, and he felt sure that autointoxication explains many indefinite symptoms of eye strain.

DISCUSSION. Dr. Brawley stated that the author of the paper claimed to do entirely without proteids. He did not see how it could be managed, for while he could do without animal proteids, it would not be easy to get along without the proteid in the wheat germ. Only in rare instances is it necessary in the judgment of the speaker to do without proteids. We are able in many cases to gradually increase the tolerance of the patient for proteids by giving very small amounts of the more digestible types.

In consultation with internists who are familiar with cases of this kind, they are found unanimous in their opposition to this constant flushing of the bowels. For immediate necessity it is invaluable, but it is claimed that it interferes later with the function of the colon and constipation may result. They prefer to use it as a temporary expedient to be followed later on by the coarser brans and fruit, or vibratory stimulation, also vibration over the lumbar area of the spine. In that way it is claimed that they break up the scybala.

In closing the discussion Dr. Hawley stated that he thoroughly agreed with everything that Dr. Brawley had said. He was desirous of shortening his paper and did not care to extend it along certain lines more than could be helped. He disagreed with one statement made by him in regard to bowel flushings. Patients who have followed instructions have been cured of constipation. If the flushing is carried out with hot water and salt along with a mild cathartic and some form of iodine, constipation is not likely to be produced. Dr. Hawley said that an internist had told him he was doing a very bad thing, that he would have a case of constipation, and he thought so himself, but at the end of eight months he was cured of constipation. Internists do not know much about it, and their success is not great. There are several forms of proteids. Fermentation in the lower bowel is nothing more nor less than bacterial disease.

The effect of the vegetable proteids is considerably different from the animal proteids, and he referred to the animal proteid. Of course there a good deal to be learned, and possibly we may change our opinion, but so far the speaker attributed his success to this one fact.

Prognosis in Eye Injuries.

Dr. Richard J. Tivnen read a paper on the above subject prefacing it by bringing out the close relation between diagnosis and prognosis in injuries of the eye. He emphasized particularly the necessity of gaining a complete history of the case in order to decide upon the best method of procedure, and suggested that as only a brief inspection of the eye is usually possible, especially with children, that the routine observance of the following working details will give satisfactory results:

First: The position of the patient during the examination: suggested a recumbent position.

Second: Good illumination.

Third: Specific instruction to the assistants.

Fourth: Arrangement of a dressing table with reference to quick action.

Fifth: Use of local anesthetic.

In addition to the foregoing, he urged the necessity of blood examination and Wassermann tests, smears and cultures from wounds and ulcers, urinalysis both chemical and microscopical, testing of visual acuity and the making of skiagraphs, two at least.

Dr. Tivnen selected for especial consideration two types of injuries, viz., Foreign Bodies in the Cornea, and Ulcers Resulting from such Trauma. In the case of the removal of a foreign body from the cornea, he emphasized the necessity of protecting the cornea until the healing is complete as a large majority of corneal ulcers are the result of foreign bodies inflicting injury, and no protective measure should be neglected. Patients suffering with corneal ulcers should not be allowed to make daily visits to the physician's office nor be permitted to engage in their regular occupations.

In the matter of injuries, a number of factors determine the tolerance of the eye to the foreign body: Infection; the chemical character of the substance introduced, glass being best tolerated by the ocular tissues since it excites no chemical change. Copper is particularly dangerous. A number of instances were cited illustrating the tolerance of the eye to retained foreign bodies, one which proved that a foreign body may be in the sclera for five years without occasioning difficulty. However such instances are rare, and this tolerance cannot be construed as a dependable nor certain element.

In the matter of perforating injuries of the globe, the ophthalmologist is always face to face with the danger of the development of a sympathetic process in the sound eye and it presents no well-defined symptoms of its incipient development nor any dependable diagnostic measures which herald its approach. Once a sympathetic process is established, it is next to impossible to stop its progress short of destruction of the eye. When light perception is lost, tension becoming gradually reduced and evidences of inflammatory reaction are present, the globe should be removed without delay. The plastic closure of the lymph spaces and vessels, it is now declared, does not absolutely protect against the subsequent development of a sympathetic process.

Injuries from electric flashes, although presenting great external evidences of severity, have been proven by experience to be of rather a temporary character; in one case where the patient complained of inability to see and intense pain in and around the eyes together with swelling, vision returned to normal within twenty-four hours, and after a period of two weeks, the reaction of the lids and globe had subsided with no impairment whatever.

Dr. Tivnen issued a word of warning in regard to the too ready assurance of the surgeon that the needling operation in cataract is entirely void of danger. This operation is not one of perfect safety as is sometimes assumed.

DISCUSSION. Dr. Clark W. Hawley said that his experience had been very similar to the author's, and one of his greatest difficulties had been to get the patient to appreciate the seriousness of the situation. He had always hoped for some way to combat sympathetic ophthalmia. A charming result was obtained by a quack in Salt Lake City by the injection into the vitreous of the eye of a considerable quantity of 1-500 bichloride of mercury. The pain was intense, but the eye was saved and so was the other.

The remarks in the paper concerning the X-Ray are very pertinent, but in one case both the magnet and X-Ray failed to locate a tiny piece of steel which was found by careful examination. It is surprising to see how tolerant the eye becomes to foreign bodies. Dr. Hawley cited a case where a piece of steel had been in the eye for a year and six months, it being very small and having entered between the cornea and ciliary body. The members of the Ophthalmological Society at that time—20 years ago—said that removal would cause the loss of the eye, but I removed the steel and the man has 20/20 vision.

Dr. A. L. Adams stated that he was impressed with Dr. Tivnen's advice to have an X-Ray examination in cases of doubt as to the presence of foreign bodies in the eye. He cited a case where the attending physician diagnosed contusion of the eye, and he was unable to find any evidence of penetrating injury as he was unable to make an examination of the fundus of the eye. In this case the X-Ray cleared up the matter immediately and a foreign body was shown lodged just posterior to the eye, in the optic nerve. The foreign body penetrated the lid in a transverse way, so that the wound had closed and was unnoticed. In doubtful cases you get much information from the use of the X-Ray, even though there is no suspicion of a foreign body being in the eye.

Dr. Carrol B. Welton was pleased to hear the statement made as to not placing too much reliance upon the word of the patient as to a foreign body being in the eye. In a recent case a patient had stated that he felt something strike his eye. On examination a foreign body could be seen in the retina, but with a magnifying glass no point of entry could be seen. In twelve hours the vitreous was so opaque the fundus could not be seen. A scleral incision was made and the body removed. The procedure should be first the ophthalmoscope, second, the X-Ray, and then the exact localization by means of the X-Ray.

Dr. H. M. Lebensohn said that in the prognosis of disease it is well to remember the resistance of the patient. A man who was blasting on the railroad got a foreign body in his eye and after several weeks the X-Ray showed the steel, which looked like a cap. After it was extracted it proved to be nothing but a small piece of exudate. The man made a healthy recovery.

Another case was a man who had a piece of steel in his eye six weeks. It was located in the lens, and a cataract was taken out at the same time. The lens was extracted and that same evening he was walking around in the basement smoking a cigar. This was due to nothing but the man's great resistance.

Dr. Lebensohn recommended strongly the use of cyanide of mercury in sympathetic ophthalmia. In a recent case the eyesight had not been saved altogether, but the vision had been improved.

Dr. Tivnen, in closing the discussion, stated that he was glad that the speakers were unanimous regarding the accepting of the patient's word. In a recent case where there was no evidence of an entrance wound the fluorescent test was used, and the patient about to be dismissed. Before dismissing him, however, a drop of cocaine was dropped into his eye, and he was taken into the dark room.. This was done without any apparent reason, but the result was amazing, as a piece of steel was laying on the retina.

The type of cases that give us the most worry are those of perforating injuries of the eye, with no foreign body in the eye, and the patient declines to have the globe enucleated. It is easy in the case of a woman or young child to allow ourselves to be influenced. If we will read Fuch's article we will obtain the method of procedure definitely and positively, and any variation is apt to result disastrously. His dictum is perception, projection test and also tension of the eye. When they fail, do not wait any longer.

A good work for this society would be to teach the radiographers to specialize in their work; for instance, we might concentrate upon two or three men in this city who will give the time and acquire the necessary equipment to localize these foreign bodies, occasionally bringing them here, perhaps, to demonstrate their plates.

On motion of the Secretary, the President appointed a committee of three, consisting of Drs. Tivnen, Lamothe and Nance, to investigate the nature of the contents of golf balls.

The Modern Therapy of Pneumococcic Infections of the Eye.

Dr. Harry S. Gradle stated that in the past our ideas of virulence had been gained by animal experimentation, but it has been recently shown that the pneumococcus in a twenty-four-hour culture will assume one of three types: first type, small, delicate, lanceolate pneumococcus. It is very virulent. The second type forms the larger diplococcus, somewhat more rounded. This is not so virulent, and is a more common type. The third type grows very luxuriantly, and is not so highly virulent. In a culture it would be taken for a true streptococcus.

The new drug, ethyl-hydro-cuprein is an absolute specific against the true pneumococcus in every respect. It has not a great penetrative power, and we cannot use the drug in closed cavities because it is highly toxic. It is very soluble in water, and as it is irritating should be preceded by a cocaine anæsthetic. The use of this drug in pneumococcic infections of the eye will cause them to disappear in two or three days. In the pneumococcic infections of the tear-sac the treatment depends upon whether the condition is accompanied by stenosis. If not, we can syringe out the passages with a 1 per cent solution of ethyl-hydro-cuprein, and get rid of the condition in a short time. Our most important advances in the line of pneumococcic affections of the eye have been made in serpiginous ulcers.

Wessely's Steam Cautery is a small instrument with two tubes going through it, one solid metal tube being kept at a temperature of 100 degrees centigrade. With that the anæsthetized cornea is massaged for a period of three minutes. Too short use of this instrument is dangerous, as it only numbs the organisms. The steam must have a chance to kill the organisms. In severe cases we must resort to the steam cautery. In the intra-ocular affections there is no advance in the therapy. We can influence those cases to a degree by the use of urotropin if we start early enough, and it is also good as a prophylactic agent.

PAUL GUILFORD,
Secretary.

7 West Madison Street.

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54 Welbeck Street, Cavendish Sq., London, W.,
August 17th.

To the Editor:

Sir: In connection with the very interesting case published by Dr. Flavel B. Tiffany, in the August number of the Ophthalmic Record, will you permit me to draw attention to an extract from the second edition of my book on Sclero-corneal Trephining, in the hope that it may support Dr. Tiffany's position, and encourage others to follow his example. It runs thus:

Conical Cornea.—The conditions of an eye suffering from conical cornea, both resemble and differ from those met with in staphyloma of the cornea. In both the intro-ocular tension, though possibly not above the average for the human eye, is yet too high for the weakened tunic. On the other hand, the iris is not adherent to the sclero-corneal coat and the chamber is deep. Trephining should therefore be a comparatively easy operation. It will probably be admitted that no operative procedure, which has hitherto been recommended for the relief of conical cornea, can be regarded as wholly satisfactory. Trephining merits a trial in these cases, and even if it fails, it will leave the eye no worse than it found it. In Madras conical cornea is so rare a condition that we had few opportunities of trephining cases of the kind. The operation seemed to be of value by paving the way for the final procedure on the cornea. Our practice was to perform a preliminary free sclero-corneal trephining in order to permanently reduce the tension of the eye well below the normal, and then a few weeks later to trephine again over the apex of the corneal cone.

Very recently, Adams, of Oxford, has published the notes of eight cases, in which he treated conical cornea successfully by cauterizing the apex of the cone, "and then at once proceeding to trephine the eye at the cornea-scleral margin, according to Elliot's method, with the performance of a subsequent small iridectomy." (The Ophthalmoscope, March, 1913.)

It was a source of regret to me that I was unable to follow up the cases I trephined in Madras before I left there (in 1913), but the experience of Dr. Adams and of Dr. Tiffany should certainly lead others to make trephining an integral part of their operative treatment of conical cornea.

Yours truly,

R. H. ELLIOT.

OBITUARY

HASKET DERBY, M. D.

Dr. Hasket Derby, of Boston, died August 21, 1914, at the age of 79. He was actively connected with the Massachusetts Charitable Eye and Ear Infirmary for about thirty years, receiving his appointment as Surgeon there about 1863 and resigning in 1891.

At the Carney Hospital he started the Out-Patient Eye Clinic, the beginning of the Out-Patient Department of that institution in 1877. He resigned in 1889, but became Consultin Ophthalmic Surgeon and was actively interested in the Hospital up to the time of his death.

He was one of the founders, and later Chairman, of the New England Ophthalmological Society.

The American Ophthalmological Society really was con-

Hasket Derby, M. D.
1835-1914

ceived by himself and Dr. Henry D. Noyes of New York. He was later elected President.

He graduated from Amherst in 1855, and immediately entered the Harvard Medical School, from which he graduated in 1858. During his last year at the School, he had the appointment of House Surgeon at the Massachusetts General Hospital.

He sailed for Europe in July, 1858, going in a sailing vessel as Surgeon (28 days). He studied general medicine for a year and a half and then took up the eye, first in Vienna under Von Arlt and Jaeger; then Berlin under von Graefe; London, Bowman, Critchett, Streatfield and Jonathan Hutchinson; Utrecht under Donders, and Paris under Desmarres and Sichell. He knew nearly all the great masters of ophthalmology of that time and later.

When the Civil War broke out, he was in Europe, and immediately wrote home asking to be allowed to return. His parents urged him to continue his studies for a time. Finally, he returned in the autumn of 1861. He joined the Cadets, and later, toward the end of the war, took service under the Sanitary Commission and was sent down to Fortress Monroe to bring back sick and wounded.

He was one of the original appointees of the Danvers State Hospital Board of Visiting Physicians, and served from 1881 to 1911, being Secretary during the entire period of service.

In 1868 he married Sarah Mason, of Boston, and there were eight children; the first and last died in infancy, the others are Eloise L., George S. (Boston), S. Hasket (San Francisco), Robert M. and Augustin (New York), and Arthur L. (New Orleans).

For many years, and up to the time of his death, he was a member of the Ophthalmologische Gesellschaft, of Heidelberg.

He was appointed a member of the Board of Trustees of the Children's Institution Department May 1, 1902, for a term of five years. He was reappointed in 1907 for another five years, but resigned before the term had ended.

Dr. Derby enjoyed a large practice and an international reputation. He retired from active work several years ago and went to live at his country place Mattapan, Dorchester.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Walter Pyle of Philadelphia has returned from a trip to British Guiana.

The American Academy of Ophthalmology and Oto-Laryngology meets in Boston, October 19-21.

D. McCluney Radcliffe of Philadelphia has received the honorary degree of LL. D. from Pennsylvania College, Gettysburg, Pa.

The Manhattan Eye and Ear Hospital, New York City, receives a bequest of $5,000 from the will of the late Jacob Langsloth.

Dr. A. C. Ragsdale has moved from Creal Springs to Carbondale, Ill., where he will limit his practice to eye, ear, nose and throat diseases.

On July 5, in Berlin, Prof. Kruckmann unveiled a bronze of the late Prof. von Michel presented by the former students, friends and colleagues of von Michel.

The first annual meeting of the Wisconsin Eye, Ear, Nose and Throat Specialists was held in Oshkosh on October 8 and 9, under the presidency of Dr. Henry B. Hitz.

Among the American doctors who have returned from Europe are Howard F. Hansell of Philadelphia; J. H. Buckley of Fort Smith, Ark.; Richard A. Reeve of Toronto; Lucien Howe of Buffalo; Casey Wood, Chicago.

Of interest to ophthalmologists is the recent celebration of the seventieth birthday of Gustav Schwalbe, anatomist and anthropologist of Strassburg, who contributed studies on the lymph channels of the eye and the topography of the brain.

The widespread contagion of trachoma in Kentucky has resulted in the exclusion of children having this disease from the public schools. Extensive plans of treatment are undertaken by the U. S. P. H. service, and teachers are being instructed in the methods of diagnosis of trachoma.

The Philadelphia Polyclinic has issued a new announcement offering a twelve-weeks course in ophthalmology. The following changes in the faculty are recorded: Dr. Thomas B. Holloway succeeds Dr. James Thorington as professor of ophthalmology; Dr. Charles R. Heed becomes associate professor, and Dr. George S. Crampton, lecturer on refraction.

The following deaths of ophthalmologists are reported:
William H. Carr of Lancaster, Pa.
Isaac W. Hazelett of San Bernardino, Cal.
Edwin Pynchon of Chicago.
Haskett Derby of Boston, Mass.
Martin H. Post of St. Louis.

Foreign journals record the following appointments:

Wilfred Harris, physician to the Royal Westminster Ophthalmic Hospital, London, Eng.

Duncan M. Mackey, honorary surgeon to the Hull Royal Infirmary, and William Bainbridge assistant ophthalmic surgeon to the same institution.

T. M. Bride, surgeon to the Manchester Royal Eye Hospital.

Dr. Seefelder of Leipsig, extraordinary professor of ophthalmology.

Dr. D. A. K. Steele has been appointed Senior Dean and Head of the Department of Surgery in the College of Medicine of the University of Illinois. It was largely through Dr. Steele's efforts that the College of Physicians and Surgeons became an integral part of the University of Illinois as its permanent medical department. Dr. Steele's appointment as Senior Dean of the College of Medicine of the university is a well-merited tribute to his successful efforts in supporting and upbuilding the college for more than thirty years.

"The Travel Study Club of American Physicians," which made a successful study tour of Europe last year, has completed the plans for its 1915 study tour to the A. M. A. meeting in San Francisco, Honolulu, Japan, the Philippines, China, with optional return via Siberia and Europe, or via Canada. This being the first party of American physicians ever visiting the Far East and the possessions of the United States a most cordial welcome can be expected by authorities and members of the medical profession. The Travel Study Club would like to make its enterprise as representative as possible and asks all those interested to communicate with the secretary, Dr. Richard Kovacs, 236 East Sixty-ninth street, New York.

NEW BOOKS.

Manual of the Diseases of the Eye, for students and general practitioners, by Charles H. May, M.D., Chief of Clinic and Instructor in Ophthalmology, College of Physicians and Surgeons, Medical Department, Columbia University, New York 1890-1903;Attending Ophthalmic Surgeon to the Mt. Sinai Hospital, New York; Consulting Ophthalmologist to Bellevue Hospital, to the French Hospital, to the Red Cross Hospital, and to the Italian Hospital, New York. Eighth edition, revised. With 377 original illustrations, including 22 plates, with 71 colored figures. Price, $2.00 net. Published by William Wood and Company, New York, 1914.

LUTHER BURBANK, His Methods and Discoveries and Their Practical Application. Prepared from his original field notes covering more than 100,000 experiments made during forty years devoted to plant improvement, with the assistance of The Luther Burbank Society and its entire membership, under the editorial direction of John Whitson and Robert John and Henry Smith Williams, M. D., LL. D. Twelve volumes. New York and London. Luther Burbank Press. MCMXIV.

The first three volumes of this unusual work are fresh from the press. Aside from the very real merit of the text and wonderful colored illustrations, these books are to be commended from the standpoint of the ophthalmologist. The workmanship, dull paper with 83 mm. length of lines, large print correctly spaced make reading a pleasure. The material presented is unbelievably interesting, even to those who know nothing of plant life.

CHICAGO EYE CLINICS.

Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
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ORIGINAL ARTICLES

OPERATIONS ON THE EXTRA-OCULAR MUSCLES.

By Edward Jackson, M. D., Denver, Colorado.

A man can easily operate himself out of practice, and no class of operations can lead more directly to that result than those on the extra-ocular muscles. Many cases of divergent squint still exist to advertise the worse than useless operative interference for convergent squint, of which some ambitious surgeon has been guilty. Students of ophthalmic surgery seek eagerly the chance to practice tenotomy or advancement, when the time could be far better occupied in learning more of the exact indications and contra-indications for such operations, and the breadth of the issues that hang upon them.

There are few operations that can be done so well by the novice as simple complete tenotomy of the internal or the external rectus; if only a kind providence places in his hands the case exactly suited to the operation. But the surgeon, young or experienced, shows blind faith in good luck, who undertakes that operation without careful and prolonged examination of the case, broad appreciation of the factors involved in the causation or perpetuation of squint, and consciousness of the possible effects of a radical interference with the mechanism of the ocular movements. No brilliancy of surgical technique, no breadth of experience that has not taught this lesson, will save him from unsatisfactory and often disastrous results.

Therapeutic measures, both operative and medicinal, have their periods of popularity and neglect. But few of real and permanent value have shown such extreme oscillations between general application, and almost universal denunciation, as these operations on the ocular muscles. Dieffenbach, in the first three years, did over 3,000 tenotomies. Guthrie did 360 in the first seven months after taking up the operation. But twelve years later so unpopular had it become that rarely was tenotomy done. When Graefe and Critchett described their technique, not essentially different from what had been practiced in the earlier days, the operation was so little known that the names of these surgeons were attached to it, and Graefe's method, or Critchett's method of tenotomy was alluded to as a new operation.

Many now present saw the rise and fall of graduated or partial tenotomy; and one school of writers led by Landolt, now takes the ground that tenotomy should not be done in any case. The operation of muscular advancement, not so easily grasped and applied by those who prefer to operate rather than to study their cases, had a long period of neglect; which ended with the second period of disappointment with tenotomy, and exploitation of new ways of placing and tying sutures. The checkered history of muscle operations reflects failure to recognize certain general principles and fundamental facts of the ocular movements. To call attention to some neglected factors that control success in this class of operations seems the best use to be made of the time allotted to me.

NEGLECTED FACTORS.

Certain anatomic conditions that bear on the effect produced by a tenotomy or advancement, such as possible multiple insertions of the tendon, or side slips and aberrent attachments, the influence of the check ligaments, and the importance of the contact arc have been dwelt upon, to the neglect of more important fundamental physiologic facts. Other important matters, although still too often neglected in the passion for operation, have been clearly explained and generally comprehended. Among these are the necessity for first accurately correcting ametropia, and observing the results of such correction before deciding how much is to be effected by operation; the influence of paresis of one or more of the muscles; the distribution of the effect of operation between opposing muscles; and the importance of preliminary education in fixation of the squinting eye, and measurement and development of the fusion sense. Because these points are generally considered in discussions of these operations they may be passed now with mere mention, in order that attention may be fixed on matters of equal importance, that are not so generally remembered.

In the discussion of operations on the extraocular muscles it is usually assumed that each muscle always turns the eye in a certain direction, has a particular function of rotating the eye which it alone performs, and takes part in no other rotation. The internus is considered solely with reference to its power of turning the eye toward the nose, the externus with reference to turning the eye toward the temple. A lateral squint is thought about as if only the internus and externus were concerned in it; an operation on one of these muscles as if it would affect only functions of the lateral muscles. This is contrary to the teachings of physiology, even as they are set forth in the average text-book. And this narrow view is fatal to accuracy and certainty in operations on the extra-ocular muscles.

THE COOPERATION OF THE VARIOUS MUSCLES.

As a rule no ocular movement is produced by the action of a single muscle; and no ocular deviation is kept up by the excessive contraction or undue relaxation of a single muscle. In a few positions of the eye contraction of a single muscle might produce movement in a certain definite direction. With the visual axis horizontal contraction of the internus alone might turn the eye toward the nose. But even with the eye in this position contraction of the superior and inferior recti join with contraction of the internus to turn it toward the nose, as one or the other has to do when the eye is turned somewhat up or down. In the same way, to turn the eye toward the temple, it is practically certain that the superior and inferior obliques always cooperate with the externus.

For most movements the muscular actions are necessarily complex. To turn an eye down and in, not only must there be contraction of the internal and inferior recti; one or both the obliques must be brought into use to prevent tilting of the retinal meridians. The great mass of ocular movements are out of the horizontal plane, thus requiring the combined use of at least three muscles to execute them. Operations on the ocular muscles are not done on the one-eyed. They are done in the interest of balanced binocular movement. Three muscles from each eye must take part in each normal ocular movement. Then for binocular vision these movements have to be so minutely accurate that each active muscle must be to some extent controlled by its opponent. In general, normal ocular movements are executed by variations of motor innervation, that involve every one of the twelve extra-ocular muscles. *An operation on any one of the muscles, if it alter the effect pro-*

duced by contraction of that muscle, alters the general muscular balance. This should be clearly in the mind of every surgeon before he undertakes an operation for squint.

PRIMARY AND SECONDARY FUNCTIONS.

It is important, however, to recognize that with regard to a particular movement of the eye, one muscle has a leading or predominant part, as the internus for turning the eye in. This may be called its primary function. The internus is the primary adductor of the eye. The superior and inferior recti, which aid the internus, may be called secondary adductors. The relation between primary and secondary adductors, alters from instant to instant, varies between extremely wide limits, and is of the utmost importance in connection with the correction of convergent squint.

From their origins at the apex of the orbit to their insertions in the sclera, above and below the cornea, the superior and inferior recti diverge from the median plane of the head. A line drawn from the center of the origin to the center of the insertion of either, would make an angle of approximately 26 degrees with the antero-posterior plane. If the right eye be turned 26 degrees to the right the superior rectus will tend to turn the eye directly up, the inferior to turn it directly down. The two muscles will have no tendency to turn the eye in. Their function as secondary adductors will be reduced to zero. If the eye be turned still further from the median plane, the superior and inferior recti will begin to help to turn the eye out; and the primary adductor, the internus, will have to oppose, besides the externus and the obliques, the superior and inferior recti, ordinarily its assistants.

If, however, the internus begins to turn the eye in, from the position of 26 degrees divergence, the secondary adductors come to its assistance, and the more the eye is turned in the more the superior and inferior recti help to turn it in. This becomes of the greatest importance in convergent squint. The secondary adductors have little power to assist in adduction when the eye is in the primary position, and have no power to initiate inward movement when the eye is turned strongly out. But as the eye approaches the limit of adduction, where the internus is fully contracted, its contact arc unwound from the globe, and its check ligament most strongly resisting it, then the secondary adductors afford most effective assistance. In extreme adduction probably more than one-half, perhaps fully two-thirds of the force required to keep the eye turned in, is exerted through the secondary adductors, the superior and inferior recti.

From the early days of tenotomy it has been a matter for remark, that in high convergent squint tenotomy of the internus produced scarcely any notable effect. The reason is that the tendons which are really holding the eye in have not been touched by the operation. This is fully proved by the results of extending the tenotomy to the nasal portions of the superior and inferior tendons. It is proved both by the extent and the permanence of the correction so obtained; and by removal of the ultimate risk of recurrence, or of divergence, that attends tenotomy confined to the primary adductor.

In high divergent squint the weak internus has to oppose beside the primary abductor, the externus, the secondary abductors, the obliques; and this without the assistance of the secondary adductors, the superior and inferior recti. In such cases the futility of tenotomy, and the superiority of advancement are well known. The latter, advancement of the internus, at once changes the direction of the eye sufficiently to bring the secondary adductors to the assistance of the internus.

THE REAL DANGER OF TENOTOMY.

The ultimate danger of tenotomy is that it may leave the eye in a state of unstable equilibrium; in which if it do not return to deviation in the original direction, it is liable to begin to deviate in the opposite direction. This danger has furnished some excuse for the view that tenotomy should be wholly discarded. The theoretic argument has usually been that tenotomy "weakened" the influence of a muscle, while advancement "strengthened" it. Comitant convergent strabismus is generally due to over-action of the adductors, and can be cured in the majority of early cases by non-operative measures that diminish the excessive contraction of the adductors. It does not seem irrational, where operation is necessary, to resort to one that will have a similar effect,—diminish the power of the adductors

The real danger of tenotomy lies not in the "weakening" of a muscle, but in transferring the predominant control of the lateral ocular movements from the primary adductor and abductor to the secondary adductors and abductors. The primary adductor and abductor tend to equilibrium near the center of the field of fixation. The eye is turned in from this point.

the action of the adductor is progressively weakened, the action of its opponent strengthened, there is the constant tendency to return toward the center of the fixation field. As the eye is turned out the power of the externus to draw or hold it out diminishes, that of the internus to bring it back increases.

With the secondary adductors and abductors the opposite is true. As the eye turns in the influence of the secondary adductors progressively increases, and the power of the secondary abductors to draw the eye back toward the center of the fixation field as steadily diminishes. When the eye is turned out the power of the secondary abductors progressively increases, and the power of the secondary adductors to bring it back to the center of its field of movement progressively diminishes. *The primary adductor and abductor tend to equilibrium with the eye at the center of its field of movement. The secondary adductors and abductors tend to draw the eye away from this center.* As the secondary adductors or abductors predominate it will be turned far in or far out; but their predominant influence will always carry it as far as possible from the center of the field.

Tenotomy of either lateral rectus tends to lessen the influence of the primary as compared with the secondary lateral rotators of the eye. When the tendon of the internus is cut not only does its cut end slip back for a new insertion; the externus rotating the eye outward draws back its insertion also. When healing is complete the tendons of both lateral muscles are so inserted that they are placed at a relative disadvantage as compared with the secondary adductors and abductors, whose insertions into the sclera have not been altered. This is most strikingly the case, when after repeated tenotomies of the internus turning out has occurred, and tenotomy has been done on the externus to remedy it. In such a case the only chance for operative cure must lie in an advancement of one (or both) muscles, sufficient to reestablish the preponderance of the primary adductor and abductor. The most striking successes of advancement have been attained in this class of cases. Let this point be clearly fixed and remembered: *the advantage of advancement lies not in increased strength of the muscle advanced, but in the preponderance given to its influence over the influence of the muscles that would assist it as their secondary function.*

EXTENDED TENOTOMY.

The danger of tenotomy lies in attacking the primary adductor or abductor, the functional predominance of which it is most important to preserve: and in leaving untouched the other muscles, whose influence should be kept subordinate. This danger is lessened while the desired effect of the operation is increased, by extending the tenotomy to the neighboring portions of the tendons of insertion of the superior and inferior recti. In helping to adduct the eye not all parts of the superior or inferior rectus participate equally. It is the nasal portions of these muscles that give the most help in adduction. In ordinary positions of the eyes some of the temporal fibres tend to turn the eye out, partly neutralizing the adducting influence of the nasal fibres. If then we divide the part of the muscle contributing most to adduction, the leaving of the other part active, beside leaving the vertical movements intact, contributes more to the desired effect, than would the complete division of the tendon.

Generally we do not think of the superior and inferior recti as helping to turn the eye out. But the temporal fibres of these muscles do so, much of the time; and when the eye is turned strongly out, as in high divergent strabismus, these fibres may constitute an important obstacle to the bringing and keeping of the eye in a normal position. I have had most satisfactory results from extending tenotomy of the externus to the external fibres of the superior and inferior tendons. Not only was an effect produced quite similar to that of extended tenotomy of the internus, but this effect was maintained several years after the operation.

The difficulties of correcting vertical strabismus by operation are such that surgeons of large experience and prudence, are often loath to undertake it. One reason for this is that pareses have been concerned in the causation of a large proportion of such squints. But a reason of equal importance is to be found in the close intermingling of the functions of elevation and depression of the eyes, with that of wheel-like rotation. The superior rectus is an elevator of the eyeball, and in all ordinary positions of the eye its contraction also causes intorsion. The inferior oblique assists in turning the eye up: but antagonizes the wheel rotation of the superior rectus by producing extorsion. The inferior rectus turns the eye down, but also helps with extorsion: while its synergist in turning the eye down, the superior oblique, is also its antagonist, in that it causes intorsion. In addition, when the eye is turned strongly up, both the lateral recti become secondary elevators helping to keep it turned up. But when the eyes are turned strongly down the lateral recti become secondary depressors, and help to keep it turned down. This latter function of the lateral recti should be borne in mind although it is of minor practical importance, as compared with the intimate relation between the vertical movements and wheel rotation or torsion.

OPERATION FOR PARALYSIS OF THE SUPERIOR OBLIQUE.

Let me illustrate this subject by the operative treatment of paralysis of the superior oblique. This muscle acting from the pulley upon the upper, inner, posterior quadrant of the sclera, tends to turn the eye down and out and to cause intorsion. Its weakness leaves the eye with movements limited down and out, and with a tendency to extorsion. When compensation has been accomplished as far as possible by distribution of these various functions among the other muscles that can take part in their performance, there commonly remains annoying vertical deviation, slight failure of the eye to turn out, and some tendency to extorsion. For this condition tenotomy has generally been resorted to, being done either on the superior rectus of the same side, or on the inferior rectus of the other eye. Or advancement on the inferior rectus of the same eye, or the superior rectus of the other eye, has been tried. Occasionally such operations have given relief. More often the result has been far from satisfactory.

Consider in detail the effect of one of them—tenotomy of the superior rectus of the affected eye. When the tendon of this muscle is divided at its insertion, it is retracted and becomes reattached to the eyeball farther back and more to the nasal side than its original attachment. This lessens its power of turning the eye up, or turning it in. But it also lessens the power of rotating the eye so as to carry the top of the vertical meridian toward the nose, intorsion; and this increases one of the most serious disabilities caused by the 4th nerve paralysis. After such an operation the patient is likely to complain of increased annoyances and disability because of the twisting of the images. What is needed in such a case is increase of the power of the superior rectus to cause intorsion along with diminished power to turn the eye up.

These indications are met by dividing the insertion of the superior rectus and causing the muscle to be reattached farther back, but more to the temporal side. This change in the direction of the superior rectus diminishes its tendencies to turn the eye up, and to turn the eye in. But at the same time it increases the tendency to intorsion, inward rotation of the upper end of the vertical meridian. Such a transplantation of the insertion of the superior rectus has the effect of a tenotomy so far as turning the eye up is concerned. But as to rotating the upper part of the eyeball toward the nose it has the effect of an advancement. The effect on convergence is of less importance; but the putting back of the insertion of the superior rectus and the carrying of it toward the temporal side, both lessen the power of the muscle as a secondary adductor of the eyeball. The indications of superior oblique paralysis may be met in other ways. The insertion of the inferior rectus of the affected eye may be brought forward and at the same time displaced toward the nose. This form of advancement transplantation lessens the tendency to extorsion at the same time it increases the power of the inferior rectus to turn the eye down. Or in rare cases it may be worth while to seek to produce compensatory effects by the appropriate operations on the sound eye.

When the change of muscular action required in a given case is but slight, it may be affected by a partial tenotomy; but of a kind quite different from that formerly advocated and practiced for heterophoria. Take a case of slight weakening of downward movement of the right eye (right hyperphoria) of less than 10 centrads (10 degree prism or 5 degree deviation) with a little tendency to extorsion, 4 to 6 centrads (2 degrees to 3 degrees) which may only appear after the eyes have been disassociated for some time, by covering one eye or keeping up vertical diplopia for ten minutes or longer. In such a case especially if there is present a notable degree (5 centrads or more) of esophoria, a partial tenotomy of the superior rectus will give great relief. The conjunctival opening should be made over the nasal end of the tendon insertion; and the nasal edge of the tendon and muscle isolated so as to make sure that it is free from attachments for 6 to 10 mm. back from the insertion. Then the insertion is to be divided from the nasal margin almost to the temporal margin leaving only a narrow but still firm strand. The effect of such an operation is to cause the insertion of the mass of superior rectus fibres farther back and more to the temporal side, than they were before. In less degree the effect is that of the outward and backward transplantation referred to above.

On a former occasion I was solemnly warned by an earnest student of the ocular movements of the danger of a lateral displacement or oblique insertion of a tendon, following operation on the ocular muscles. It is with that warning in mind that this paper has been devoted to the statement, illustration and emphasizing of the principles; and not to the description of particular operations or cases. Any one of you who will fully study out the teachings of physiology with regard to the intrinsic muscles of the eye, and apply them in all his operations on these muscles, can work out his own specific operations and technique. One who has not studied minutely the physiology of the ocular movements, but who follows diagramatic statements of their function, and rule of thumb summaries of indications for such operations, would far better never undertake to operate on the extra-ocular muscles. The better understanding and more exact application of the principles involved, will extend the field for operating on the extra-ocular muscles, both among the doubtful and perplexing cases of the general kinds that we now operate on, and to include some cases that have been regarded as quite beyond assistance by operation.

SUBSTITUTION OF ONE MUSCLE FOR ANOTHER.

The possibilities of completely changing the functions performed through particular muscles have been demonstrated in orthopedic surgery where extensors are made to do the work of flexors, or vice versa. In the orbit, Motais' operation for ptosis has put the superior rectus to the task of elevating the lid. Hummelsheim has replaced the paralyzed external rectus by slips taken from the temporal sides of the superior and inferior recti tendons, and grafted to the insertion of the tendon of the externus, thus giving abduction power of 30 degrees, where through congenital defect abduction had been wholly absent.

The condition of a patient with complete oculo-motor paralysis is more deplorable than that of one with complete opthalmoplegia externa. In the latter case the eye remains directed forward, there is no marked deformity, and with appropriate prisms it may be possible to use the eyes together with comfort. But in oculo-motor paralysis, the muscles which retain function (the externus and the superior oblique) soon turn the eye strongly out, and keep it turned out; until more than one patient has been willing to sacrifice a seeing eye to escape from an extremely obvious and unsightly deformity. Taking careful note of the physiology of the extra-ocular muscles, and the requirements of the case, it will certainly be possible in future to give these patients some relief.

The superior oblique must be separated from the part of its tendon attached to the posterior quadrant of the globe; and its force applied to the anterior segment of the eyeball at or about the insertion of the internus, probably by connecting the oblique with the internus tendon of insertion. Then the externus tendon must be split and transplanted, one-half to the upper, the other half to the lower outer quadrant of the eyeball. When we get the two active functioning muscles attached to three points of the anterior segment of the eyeball by insertions removed from each other by intervals of approximately one-third circumference we will have a condition of stable ocular equilibrium, which will probably serve about as well as that of almost complete ophthalmoplegia externa. He would be a rash operator who first attempted this operation with eyes capable of binocular vision and diplopia. But where the danger of diplopia was absent, the cosmetic improvement attainable would almost certainly be satisfactory.

In conclusion. I have tried to state and emphasize: certain facts of the physiology of the ocular movements, that are essential to an intelligent, exact planning, of operations to be done on the extra-ocular muscles.

That these muscles do not act alone, but each movement or position of the eyeball, depends on co-operation and mutual adjustment of the actions of many or all of these muscles.

That in lateral squint, secondary adductors and abductors may be as important to consider as the primary adductor or abductor.

That dominance of the primary adductor and abductor must be preserved to secure stable equilibrium of the eye near the center of the field of fixation.

That vertical squint requires an operation changing the relative extent of the various functions performed by the same muscle; and,

That careful application of physiologic principles will materially extend the field for operative interference with the extra-ocular muscles.

HETEROPHORIAS AND THEIR TREATMENT.

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At the very beginning of this paper I must be allowed to express my gratification over the fact that no oculist now thinks it to his credit to stand before an audience and confess, for himself, that he knows nothing about the so-called abnormalities of the ocular muscles, and cares less; and then confess, for his colleagues, that he does not believe that anybody else knows more than he does. This study is now dark only to him who has not sought the light that is available, and is difficult only to him who prefers darkness rather than light. In either case the one thus afflicted is now willing to remain quiet whenever muscle errors are under discussion.

The muscle study has been greatly retarded for three reasons:

(1) Helmholtz's error in locating the poles of the eye made the mastery of the study of ocular rotations most difficult, if not impossible. H. Knapp complained to him that he had great difficulties with his chapter on "Movements of the Eyes," and to him he promised to write a new chapter, that he might make the subject clear and easy of comprehension. This promise he never fulfilled, for the reason that he could not rid himself of his fundamental error in the location of the poles of the eyes.

(2) Because of the difficulties of understanding the nature of ocular movements, in harmony with Helmholtz's teaching, it became popular to cover ignorance of abnormal muscle conditions with a blanket declaration that, whatever may be the nature of a muscle error, it depends, for its existence, on errors of refraction the correction of which will cure the muscle abnormality. Such teaching as this has been most hurtful even to the science and art of refraction.

(3) Still another retarder of progress in the muscle study has been the unscientific instruments for the detection and measurement of muscle errors. Binocular phorometers, except for the detection and measurement of cyclophoria, have not been reliable, and the Maddox rod has its legitimate use only in its relationship to cyclophoria.

The monocular phorometer has five correct fundamental features: (1) It stands before only one eye and can not interfere with the retinal image of the test-object in the other eye;

(2) the displacing prism is of such a strength as to throw the image of the test-object on the other retina outside the field or area of possible fusion; (3) the measuring prism—the Risley rotary prism—moves only the displaced image; (4) it is a reversible instrument, so that it can be made to test the muscle adjustment of either eye; (5) the uncovered eye must fix the object as seen by it, and thus allow the false object to go where it may.

The treatment of heterophoria presupposes a thorough knowledge of the principles on which is based the muscle study. I must refer the reader to the first chapter (145 pages) of Ophthalmic Myology (2nd edition) for all of what I would say here on these fundamental principles, if space only permitted.

A few words concerning the poles of the eye and the spacial poles will serve a useful purpose in this paper. The central point of the macula is the posterior pole of the eye. From this pole the visual axis passes forward, through the center of the retinal concave (the center of rotation), through the cornea, on out into space. The point of the cornea cut by it is the anterior pole of the eye, whether that point be the center of the cornea or removed from the center. On this visual axis, somewhere in space, but at no fixed point, is the monocular spacial pole. Through this spacial pole pass all spacial meridians, each lying in the same plane with the corresponding retinal meridian, the retinal and spacial meridians having a common center. The corresponding points on the retinal and spacial meridians are connected by a straight line passing through the center of retinal curvature, which line must be a radius of retinal curvature prolonged. The direct point of view is at the spacial pole and its image is on the retinal pole, hence the visual line (the visual axis) connecting them is a radius of retinal curvature prolonged. All lines of visual direction are radii of retinal curvature prolonged which could not be if the posterior pole of the eye was other than the central point of the macula. Spacial and retinal meridians could not correspond if they were not concentric, and did not lie in the same plane.

Fig. 1 shows the spacial pole and spacial meridians of the left eye, also its field of vision. Fig. 2 shows the same for the right eye. The vertical and horizontal meridians, as well as all the others, are cut by circles, every point on each circle being equally distant from the spacial pole. These circles are ten degrees apart, the markings being only on the vertical and

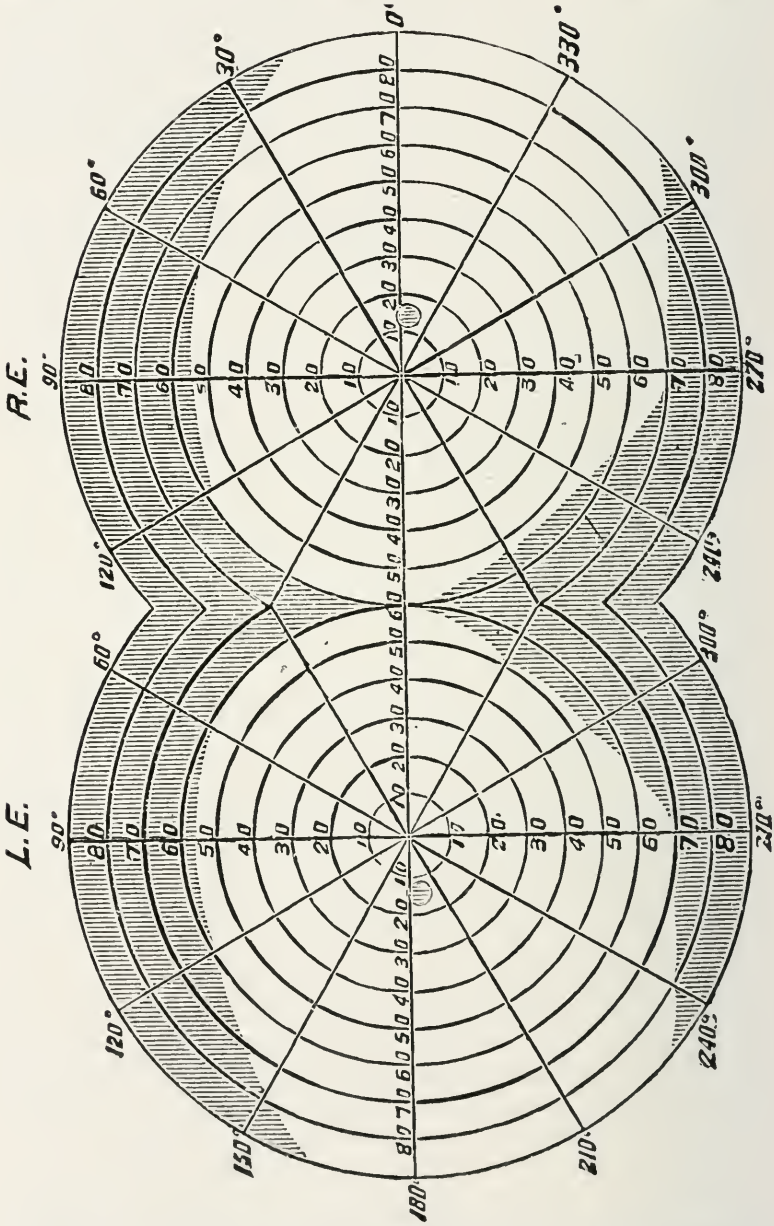


Fig. 2.

Fig. 1.

Figs. 1 and 2. Spacial Poles, Meridians and Fields of Vision of the Eyes.

horizontal meridians. These circles are all in planes parallel with each other and with the plane of the equator of the eye.

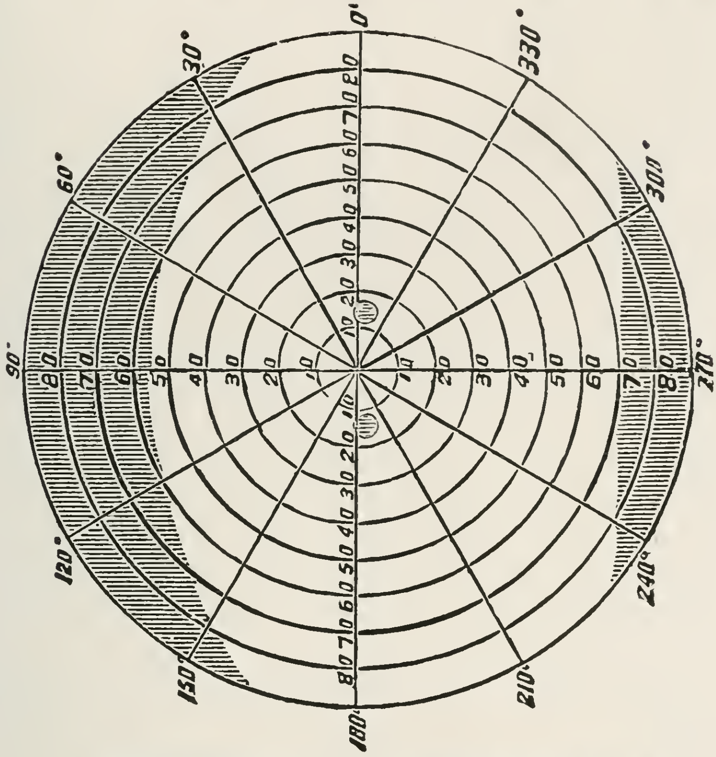


Fig. 4. Binocular Field of View.

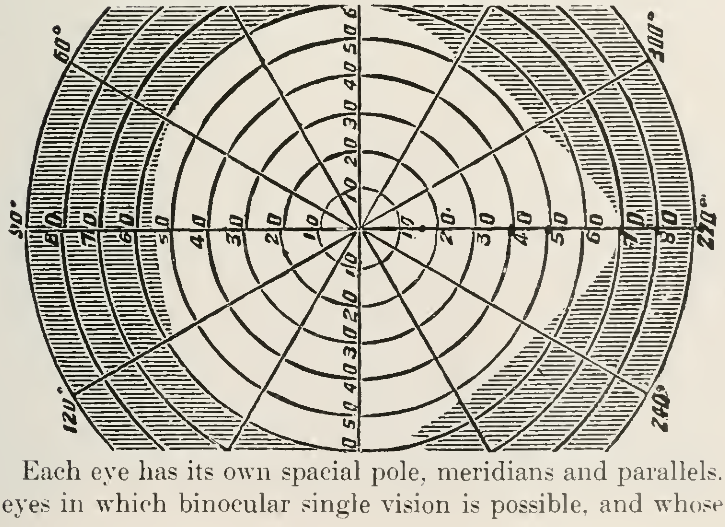


Fig. 3. Binocular Field of Vision.

Each eye has its own spacial pole, meridians and parallels. In eyes in which binocular single vision is possible, and whose muscles are normal in tonicity, the two spacial poles are easily brought together and fused into the one binocular spacial pole, by the eight recti muscles; and the two monocular vertical spacial meridians are fused into one binocular vertical spacial meridian by the four oblique muscles, which means, of course, that all monocular spacial meridians have been fused into binocular spacial meridians. The monocular spacial parallels are likewise fused into binocular spacial parallels, as a result of the fusion of the poles and meridians. Thus is created the binocular field of vision, shown in Fig. 3, and the much larger binocular field of view as shown in Fig. 4.

The field of binocular vision (Fig. 3) was constructed by dividing Figs. 1 and 2 each along the vertical meridian (after having separated the two monocular fields by a vertical cut), transposing the right half of the left field and the left half of the right field, and bringing them together along the vertical meridian. In this binocular spacial field of vision there is not a point that is not common to the two eyes. In this space there is perfect fusion. The binocular spacial pole is the point of fixation. Every point in this field bears a definite relationship to this pole, in that it lies on some one of the binocular spacial meridians.

The binocular field of vision is practically the binocular field of rotation. Eyes whose muscles can easily create the binocular field of vision can just as easily carry the point of fixation (the binocular spacial pole) from the direct point of view to any other point within this space, and always along the plane of that spacial meridian in which lie both the first and second points of view.

The binocular field of view, shown in Fig. 4, was constructed by bringing together the outer halves of the two monocular fields and uniting them along the vertical meridian. The binocular field of vision and the binocular field of view have the same measurements along the vertical meridian, but not along the horizontal meridian. All objects in the binocular field of view, occupying the spacial concave, lying within the sixth parallel, are seen singly by the two eyes, and can be reached by binocular rotations, without any movement of the head (really the field of rotation is not quite so large). All objects lying outside the sixth parallel are seen singly but by only one eye, those to the left by the left eye and those to the right by the right eye. Only by turning the head can the two eyes be made to fix any one of these objects. The binocular field of view includes the binocular field of vision, but the former is 180° across, while the latter is only 120° across.

The binocular field of vision (Fig. 3) may be called the field of version, that field in which the eyes may be turned from point to point by the ocular muscles, each pair under the control of a single conjugate brain center. Rotation in the plane of the horizontal meridian should be accomplished by only two muscles, the externus of one eye and the internus of the other, each receiving an impulse—a discharge of neuricity—from one common (conjugate) brain center. These muscles are the right and left vertors. Along the plane of the vertical meridian, the binocular pole (point of fixation) must be carried by the combined, harmonious action of two pairs of muscles, each pair under the control of its own conjugate brain center. These two pairs are either the subvertors or the supervertors. The subvertors are the inferior recti and the superior obliques; the supervertors are the superior recti and the inferior obliques. All oblique rotations are effected by the combined action of three pairs of muscles, each pair under the control of its own conjugate brain center. One muscle of each of the three pairs receives supplemental neuricity from its individual nerve center, belonging to the class of fusion or duction centers, always individual and never conjugate.

Except in oblique rotations, no fusion or emergency center ever is called into action, if each muscle of every pair is normal in tonicity.

It will be profitable to study the field of duction in contrast with the field of version. As already shown, the field of version nearly corresponds with the field of binocular vision (see Fig. 3). The field of duction is shown in a crude but clear way in Fig. 5. In the study of this figure it is better to speak in the terms of prism-degree, which, as is well known, is not the same as a degree-of-arc.

In the study of the binocular field of vision the degrees are degrees of arc, as is also true of the study of the binocular field of view. The field shown in Fig. 5 may be studied as the field of binocular fusion or the field of duction. This retinal field which has its corresponding spacial field, is kite-shaped, as shown by the outline a-b-c-d. The horizontal meridian bisects this field, in each eye, and the center of the macula, e, is the commanding point in this field. Along the horizontal meridian the normal extent of this field may be said to be 32 prism degrees—from the fovea outwardly 24°, and inwardly 8°. Along the vertical meridian the extent is only 6 prism degrees—3° upward from the fovea and also 3° downward. This field could have no existence if the ocular muscles were controlled by conjugate brain-centers only. Its existence and importance depend on the fact that there is, for every individual ocular muscle, and individual brain center, neuricity from which is always and only sent to the one muscle with which it is connected, and that in the interest of binocular fusion. The areas shown in both the right and left eyes mark the limitations of the effective power of the fusion centers on their respective recti muscles, in the interest of binocular single vision. The duction power is much less than the verting power, and the two terms should never be confounded. Except in oblique rotations of eyes whose muscles are normal in tonicity, the fusion centers are forever at rest. In heterophoric conditions, whether the eyes are still or in motion, some of these centers are forever active, getting rest only when one or both eyes are closed. They are alert in such eyes for the reason that without their activity, in the interest of binocular single vision, there could be no binocular spacial pole and meridians, hence no binocular single vision.

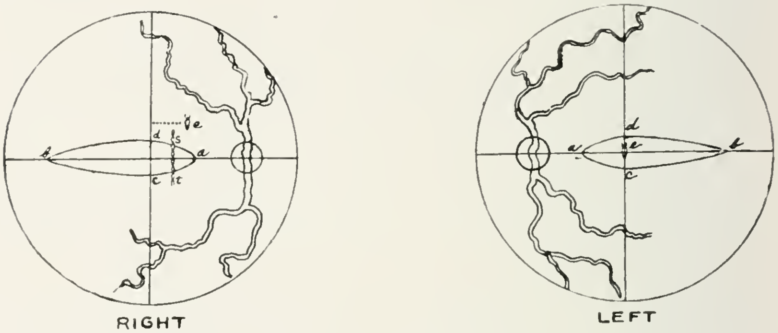


Fig. 5. The Field of Duction.

One or more of these fusion centers is alert in the interest of binocular single vision, at the sacrifice of the binocular spacial pole and meridians, whenever some external agent, as a prism in any position, or a cylinder in an oblique position, displaces the image in one eye but not to such an extent as to throw displaced image beyond the field of fusion a-b-c-d- (Fig. 5). An image thrown beyond this field develops insuperable diplopia.

The fusion field, a-b-c-d Fig. 5, is that of the recti muscles. The part from e to b belongs to the internus, the part from e to a belongs to the externus, the part from e to d belongs to the inferior rectus, and that from e to c belongs to the superior rectus. The area e-b-d is presided over by the fusion centers controlling the internal and inferior recti, and the area e-b-c by those of the internal and superior recti. The fusion center for the external rectus is watchful over the nasal area c-d-a, in the upper half of which (d-e-a) the center for the inferior rectus is an ally, while in the lower half (c-e-a) the center for the superior rectus is an ally. Thus it is easy to determine the muscle or muscles that must be called into fusional activity when an image has been displaced by a prism in a given direction. Over this entire area reigns the guiding sensation of the retina which commands the basal fusion centers of the recti, which, up to the limit, are her obedient subjects. A fugitive image beyond the fusion area is not to be captured and carried to the macula—or rather the macula carried to it—by the activity of any fusion center, hence there must be diplopia.

The existence of the fusion area enables us to test the lifting power of any rectus muscle in both orthophoria and heterophoria, which power may be normal, subnormal or supernormal. This test should always be made with the Risley rotary prism, supplemented, if necessary, with a stationary prism. The rotary prism, set for testing the strength of the internus, while moving the image along the line e-b, compels the internus to so rotate the eye as to cause the macula to accompany the moving image. The moment the image is carried beyond b in the right eye, the right third fusion center ceases to act on its internus and diplopia results. The same things are true of the three other fusion centers presiding over the other three cardinal directions from the macula—below, the first; above, the second; nasalward, the fourth. These four centres in their numerical order cause superduction, subduction, adduction and abduction. The normal extent of the first and second is 3°, of the third is 24°, and of the fourth is 8°.

Again the existence of the fusion areas enables us to determine accurately the comparative tonicity of the two muscles constituting any pair, as the superior and inferior recti, the external and internal recti, and the superior and inferior obliques. In thus testing the recti the monocular phorometer has no rival. It is shown in Fig. 6.

It consists of a stand for supporting a frame-work for the Risley prism and a displacing prism (F), with an attached spirit level regulated by the screw B. With the rotary prism set as shown in the cut, the rotating screw, D, horizontal, the muscles, whose tonicity is under test, are the lateral recti of the left eye. To complete the readiness for the test, the 6° displacing prism must be set, base up, in the slot toward the eye. This will throw the retinal image of the test object directly up, and beyond d (Fig. 5), hence outside the fusion area. The false object will be below in the field of view (Fig. 4), and just as far in degrees below the binocular spacial pole as the image is above the macula. The image in the other eye is on the macula and the true object is at the binocular spacial

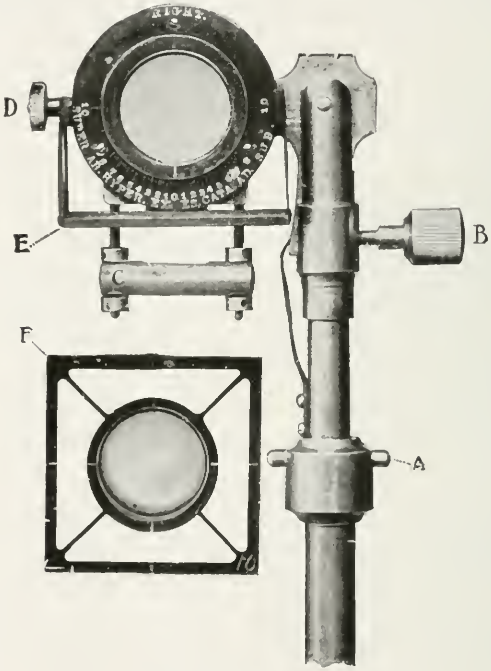


Fig. 6. Monocular Phorometer.

pole. This is the object—the one seen by the right eye—that must be fixed. The displaced, or false, object will relate itself to the true object, just as the lateral recti muscles relate the vertical meridian of the left eye to the false image. If these muscles are orthophoric—have normal tonicity—the displaced image will lie on the vertical meridian above d (Fig. 5), and the false object will lie on the vertical binocular spacial meridian directly below the binocular spacial pole. This is lateral orthophoria which may be sthenic or asthenic, for muscles that balance each other in tonicity may be either strong or weak.

If, under the above test, the false object should appear to the left of the vertical spacial meridian, it would be due to the turning nasalward of the eye under test. This turning would be chargeable to excess of tonicity of the left internus, and not to contractility, for, under the test, no brain center sends an impulse to the internus, unless the eyes be hyperopic. In this turning the vertical retinal meridian has been displaced outward, while the vertical spacial meridian for that eye has been displaced, to the same extent, toward the opposite side, the two always remaining in the same plane. If the eye has been rotated nasalward 10°, the object will appear to be on a vertical spacial line 10° to the left of the vertical spacial meridian, although the prism has displaced it directly beneath the true object. The rotary prism moves the false image outwardly, as the false object moves inwardly, until, finally, the patient says that the false object stands directly under the true one. It does this only when the rotary prism has carried the false image to the displaced vertical retinal meridian. Then and then only it appears to be on the vertical spacial meridian of the other eye, in obedience to the law of corresponding retinal points and lines. The law of visible direction, unmodified by the law of corresponding retinal points and lines, would make the false object appear ten degrees to the right of the vertical spacial meridian of the other eye, and on its own displaced vertical spacial meridian. In such eyes, when under test, there is no binocular spacial pole, nor binocular spacial meridians. When not under test the fusion or duction centers (the right and left fourth basal centers), for the two externi compel the creation of the binocular field of vision (Fig. 4), and the binocular field of view (Fig. 5),—the binocular spacial pole and meridians. This condition is Esophoria and it may be either pseudo or intrinsic. If intrinsic it may be either sthenic or asthenic. The full meaning of these terms will be shown in the study of the treatment.

Again another pair of eyes under the same test would show the false object below and to the right of the true object, although the false image has been displaced directly upward. Its apparent position to the right has been caused by an outturning of the eye under test, and this turning has been due solely to an excess of tonicity in the left externus. The extent of this turning is never greater than the excessive tonicity would cause, but if the eyes should be hyperopic, the resulting pseudo-esophoria will lessen the quantity that would otherwise be shown. Under the test of such eyes there is no binocular field of vision (Fig. 4), or of view (Fig. 5). When not under test the right and left third fusion centers, acting on their respective weak interni, compel the binocular spacial pole and meridians, in obedience to the law of corresponding retinal points and lines. This condition is exophoria and that shown under the distant test is always intrinsic. It may be sthenic or asthenic. Pseudo-exophoria exists only in the near. Pseudo-esophoria shows itself in both the far and the near, when it is caused by hyperopia, but it shows itself in the near only, in emmetropes whose ciliary muscles are subnormally developed. Pseudo-exophoria is caused by myopia, or by hyperdeveloped ciliary muscles. Under the heading "treatment" each of these pseudo-conditions will be considered. .

Turning the screw-head D (Fig. 6), into the vertical position, with the index at zero, the phorometer is in position for testing the vertically acting muscles. The ten degree prism, base in, should now replace the six degree prism used in the test for the lateral muscles. This prism will throw the retinal image of the test object beyond a (Fig. 5), and thus will take all brain-centers, connected with the ocular muscles, off their guard. The left eye still being the one under test, the false object will stand at the left of the true. If it appears lower than the true object, it is because the eye has been turned upward by the superior rectus of that eye, the turning being effected by excessive tonicity of that muscle and not by the slightest contractility. The rotary prism readily measures the extent of the downward displacement of the object by carrying the false image downward until it comes to the displaced horizontal retinal meridian. Under the test the left spacial pole has been moved upward, thus destroying the binocular pole and confusing the binocular field. The binocular pole and meridians (the binocular field) are restored, on removing the phorometer, by action of the left second basal center on the inferior rectus of the left eye. This is left hyperphoria which is always intrinsic, but may be either sthenic or asthenic.

If the false object had appeared higher than the true, it would have been thus placed because of excessive tonicity of the inferior rectus of the left eye, rotating the eye downward. The extent of the apparent elevation of the false object is easily measured by the rotary prism carrying the false image upward until it reaches the displaced horizontal retinal meridian, at which moment the false and true objects will appear to be on the same level, in obedience to the law of corresponding retinal points and lines, but contrary to the law of visible direction, as to the eye under test. The eye not under test sees the true object in its real position in obedience to the law of visible direction. Removing the phorometer, the left first basal. or fusion, center acting on the left superior rectus, restores at once the binocular spacial pole and meridians, and brings perfect harmony in the binocular field of vision (Fig. 4). This condition is left cataphoria, which is always intrinsic but may be either sthenic or asthenic.

All of these tests may be applied to the right eye by placing the phorometer in front of it. The test of the lateral muscles will show orthophoria, esophoria or exophoria, as the muscle tonicity may determine, in the two eyes. When there is left hyperphoria usually there is right cataphoria, of the same degree, and vice versa. Rarely there is a double hyperphoria or a double cataphoria.

Cyclophoria. plus or minus, may be shown, but can not be measured, by the rotary prism, used as in measuring a hyperphoria, but without an accessory prism. The test object should be a line. either in the distance or at the near point. With the index at zero the line will appear single. Moving the index downward or upward beyond three degrees will double the line. If the two lines are parallel the superior and inferior obliques of the two eyes have equal tonicity. If the lines are not parallel, the loss is chargable to the obliques of the eye seeing the false line. If it inclines toward the opposite side, the condition is plus cyclophoria (want of tone in the superior oblique) : if it incline toward the same side the condition is minus cyclophoria (want of tone in the inferior obliques). The author's cyclophorometer, or the Stevens clinoscope, will both detect and measure an existing cyclophoria, and will name it either plus or minus.

TREATMENT.

1. ORTHOPHORIA.

Errors of refraction should always be corrected in cases of orthophoria. If the eyes should then cause trouble, the orthophoria certainly belongs to the asthenic type, which might have been determined at the first examination. Orthophoria with abduction of eight degrees or more, and sub- and superduction of three degrees or more, is sthenic and will need no attention. An orthophoria with abduction of six degrees or less, and sub- and superduction of two degrees or less, is asthenic and should be treated by ceiling-to-floor and wall-to-wall exercise. If abduction is low, but sub-duction and superduction are normal, the treatment must be wall-to-wall exercise. If the abduction is normal and subduction and superduction are low, the treatment must be ceiling-to-floor exercise. These exercises should be practised daily, always rhythmically and short of fatigue, until the duction power of the weak muscles has been brought up to the normal.

Sthenic orthophoric eyes can easily create and maintain the binocular field of vision (Fig. 4), and the binocular field of view (Fig. 5), whether the binocular spacial pole be at infinity or at the reading distance. Asthenic orthophoric eyes can easily create and maintain these binocular fields (Figs. 4 and 5), when the binocular special pole (the point of fixation) is far removed, for muscle tonicity alone then controls; but. when the binocular spacial pole is near by, these fields are maintained but at the cost of muscle fatigue, coming from muscle activity. The reason for the exercise treatment of asthenic orthophoria must be clear.

2. ESOPHORIA.

Pseudo-Esophoria.—That caused by hyperopia, is curable by the spherical lenses which fully correct the hyperopia. The pseudo-esophoria caused by weak ciliary muscles, shown only in the near, is curable by means of minus spheres (.50 to 1.00 D), used for rhythmically exercising these muscles. Orthophoria in the far and esophoria in the near test always means weak ciliary muscles. In making these muscles strong by exercise, or rendering them a certain amount of assistance in their weakness by means of plus lenses for near use, though there may be neither hyperopia or presbyopia, each will correct the pseudo-esophoria. The exercise lenses are far preferable to the rest lenses. Pseudo-esophoria makes the same demand of the right and left fourth basal or fusion centers as does intrinsic esophoria, and the demand for treatment is just as urgent.

Intrinsic Esophoria.—This is readily distinguishable from pseudo-esophoria, and it demands treatment that relief may come to the externi and the two fusion centers controlling them. It is only by means of activity on the part of these muscles and their fusion centers, in cases of untreated intrinsic esophoria, that the binocular spacial pole (Fig. 4), can be created and maintained. The quantity and kind of esophoria determine the character of treatment. Low grades of either sthenic or asthenic esophoria may be cured by rhythmic prism-exercise of the externi. Developing the externi gives them increased tonicity for balancing the formerly too strong interni, thus allowing the right and left fourth fusion centers to have the rest which is theirs in natural lateral orthophoria. Only rhythmic exercise, short of fatigue and not repeated too often, will build an ocular muscle. These lighter cases of esophoria can be treated by prisms in position of rest for the externi—bases out. They should not be strong for the reason that any prism destroys the binocular spacial pole, interferes with the law of visible direction, and disturbs orientation. The stronger the prism, the greater the disturbance.

In the higher degrees of intrinsic esophoria nothing can be accomplished by either exercise of, or rest prisms for, the externi, hence relief must come as the result of operations. In asthenic esophoria, best determined by the low abduction found, the weak externi should be shortened, so that the orthophoria obtained may be of the sthenic variety. To weaken the interni by partial tenotomies, in such cases, would establish an orthophoria of the asthenic kind. The shortening of the externi, in such cases, would easily create the binocular spacial pole both in the distance and near-by; while the tenotomies would make easy the creation of the distant binocular spacial pole, but the eyes could not easily maintain the binocular pole in the near.

In sthenic esophoria, also best determined by finding abduction normal, or only slightly subnormal, the operations should be partial tenotomies of the interni. In some of these cases the esophoria may be so great as to require a shortening of the externi in connection with the partial tenotomies of the interni. In no case should the tenotomy of the interni be complete, nor should the externi be advanced—partial tenotomies and shortenings or tuckings, one or both, are all-sufficient. Straight-forward shortenings of the weak muscles, and central tenotomies of the too strong muscles, must be done unless there is a complicating cyclophoria. The purpose of every kind of treatment of esophoria is the production of sthenic orthophoria, which means that any complicating error of the superior or inferior recti and of the obliques must be treated at the same time. Orthophoria of all the recti muscles is essential to the easy creation of the binocular spacial poles and parallels, while orthophoria of the obliques is essential to the easy creation of the binocular spacial meridians. All of these muscles, when orthophoric, accomplish, with the greatest ease, the creation of the binocular fields of vision (Fig. 4) and view (Fig. 5). This is done by tonicity only when the binocular pole is at practical infinity, which implies that they can easily maintain the binocular field whatever may be the distance of the binocular pole.

3. EXOPHORIA.

Pseudo-exophoria.—This can exist only in the near and should be treated without operation. If its cause is Myopia, its cure is concave lenses to be worn in all near work for the correction of the exophoria. Myopes are all too prone to take off their lenses in near work. Exophoria in the near, when the eyes are emmetropic or even hyperopic, in excess of an exophoria in the far, or when there is distant orthophoria or even esophoria, can hardly be classed as a pseudo-exophoria; but certainly it can not be classed as an intrinsic exophoria. Hyperdeveloped ciliary muscles may often be charged with the production of this form of exophoria. Such muscles requiring but a small impluse from the tenth conjugate center to the ciliary muscles, for focusing rays of light, cause but a small discharge of neuricity from the third conjugate (convergence) center, which must be supplemented by a sufficient discharge from the right and left third fusion centers to produce full convergence. The hyperdevelopment of the two interni, in harmony with the hyperdeveloped ciliary muscles, is essential, in order that the associated small impulse from the third conjugate center may be able alone to accomplish correct convergence. This can be done by the candle exercise method. Whatever may be the cause of this want of converging power, the curative treatment is the candle-exercise, always short of fatigue and not too often repeated. Shortening of the interni would make them respond more readily to the small associated impulse, but this ought not to be done unless faithful and long-continued candle-exercise has failed. Prism exercise of convergence is better than no exercise at all, and is preferable to operative interference. Deficiency of convergence is one of the most common forms of heterophoria, and it can not be ignored. Lenses for near use, in young people, can not be satisfactorily prescribed without a knowledge of exophoria in the near, and of all other forms of lateral heterophoria.

Intrinsic Exophoria.—This shows itself in both the far and the near tests, and if there is not a complicating pseudo-heterophoria, the measurements will be the same at these two points. This error may be sthenic or asthenic, and it may be of high or low degree. Prismatic exercise of the interni, rhythmic in character, not too severe, and not too long continued, will cure the slighter cases of either sthenic or asthenic exophoria. The candle exercise is not indicated in these cases. If the worth of the method of prism-exercise of the interni were fully appreciated by the oculist and the patient, there would be greater persistency in its use, and splendid results would follow in many cases. The purpose of the exercise is to increase the tonicity of the interni, so that the right and left third fusion centers may be relieved of abnormal work, at all distances, which would mean that the interni would be relieved of abnormal contractility.

Operations alone can cure the higher degrees of exophoria, whether sthenic or asthenic. The true nature of the case, which can be determined by the abduction test, determines which muscle shall be operated on, and the kind of operation that should be done. The case that shows eight degrees or less of abduction is asthenic, and would be made worse by partial tenotomies of the externi. Shortening of both interni alone should be done. This would increase the tonicity of the interni without lessening the tonicity of the externi. These operations would produce a sthenic orthophoria. Partial tenotomies of the externi would produce an asthenic orthophoria.

An exophoria with ten degrees, twelve degrees, or more, of abduction is sthenic and demands a partial tenotomy of both externi, and in the higher degrees of this class of cases, both interni may have to be shortened. In no case of exophoria should the interni be advanced. The partial central tenotomies of the externi alone, or associated with straightforward shortening or tucking of the interni, will cure all these cases, which are uncomplicated.

The purpose of the treatment of exophoria, as outlined above, is to make the opposing muscles equal in tonicity, so that there may be sthenic orthophoria. Orthophoria thus acquired can easily create and maintain the binocular spacial pole and fields of vision and view. If not treated, exophorics will create and maintain the binocular pole and fields at the expenditure of nerve force from the right and left third fusion centers and the consequent corrective activity of the two interni.

Prisms in position of rest for the weak interni are open to the same objection as stated in connection with the study of the treatment of esophoria by rest prisms for the weak externi. The best that can be said of prisms in positions of rest for lateral heterophoria is that they are better than no treatment at all.

4. HYPERPHORIA AND CATAPHORIA.

These errors are never pseudo but are always intrinsic. They may be sthenic or asthenic. When low in degree they may be cured by prism-exercise of the weak inferior rectus of the one eye and the weak superior rectus of the other eye, or they may be greatly helped by a weak prism base down before the hyperphoric eye. A rest prism in hyperphoria is less objectionable than in esophoria and exophoria, only because of the comparative weakness which makes them cause only slight disturbance in orientation. If the exercise by means of prisms is resorted to, the same careful rhythmic method should be observed.

Hyperphoria and cataphoria of high degree must be treated by operations—partial tenotomies. If these errors are uncomplicated by cyclophoria, the tenotomies must be central. The first tenotomy should be done on the superior rectus of the hyperphoric eye. Any remaining cataphoria of the other, which means that there would still be some hyperphoria of the eye already operated on, should be relieved by a central tenotomy of its inferior rectus. Usually these two operations will accomplish the desired results—vertical orthophoria. Should there still remain some vertical imbalance, the final operation should be a shortening of the inferior rectus of the hyperphoric eye. There should be an interval of a month or more between these several operations.

Most cases of hyperphoria and cataphoria belong to the sthenic class as can be shown by high superduction of the one eye and subduction of the other. Should the case be asthenic, as shown by low duction power of the stronger muscles, the whole correction should be attempted by a shortening of the inferior rectus of the hyperphoric eye.

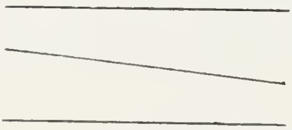
The treatment, other than by rest prisms, has for its object the procuring of sthenic vertical orthophoria, so that the first basal center on one side (cataphoric) and the second basal center on the other side (hyperphoric) may be relieved of abnormal work in the creation and maintenance of the binocular spacial pole and fields.

Adduction has not been mentioned as a means of determining the sthenic or asthenic nature of either orthophoria, esophoria or exophoria, for the reason that it is too variable for reliability. The verting test, which can be made with the Stevens tropometer or with the ordinary perimeter is more interesting than it is indicative of the proper line of procedure in the treatment of any condition of the recti muscles. Eyes that are sthenically orthophoric, as shown by abduction, sub- and superduction, will have full verting power. Every procedure outlined above, based on the duction test, looks towards the production of sthenic orthophoria which guarantees full verting power.

5. CYCLOPHORIA.

The forms of heterophoria already studied point to the fact that the recti muscles have not that harmony (equal tonicity) that would make easy the creation and maintenance of the binocular spacial pole, and yet the eyes thus afflicted must do this work. Cyclophoria is that condition of the obliques, as to tonicity, which makes the creation and maintenance of the binocular spacial meridians difficult, and yet they must accomplish this task.

To show the existence of cyclophoria the same principle is involved as in the test of the recti muscles for imbalance; that is, the image of the test line in the one eye should be thrown entirely outside the boundary of the fusion area. In this the cyclophorometer has the advantage over the clinoscope, though with either instrument the error may be detected and measured. The error was first discovered by means of a double prism, each six degrees, bases in contact, before one eye, the test object being a horizontal line. The axis of the double prism being vertical it was so held as to double the line for that eye, the two lines of necessity being parallel. The other eye saw a third line between these two which should have been parallel with them. In the case in which the discovery was made, the middle line dipped towards the opposite side, as shown in Figs. 7 and 8, which is the first illustration ever used for showing loss of parallelism between the vertical axis of the eye under test with the median plane of the head.



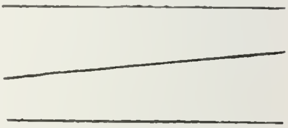


Fig. 7. Left + Cyclophoria. Fig. 8. Right + Cyclophoria.

This discovery, with this illustration, was published in the January (1891) issue of the Archives of Ophthalmology, It might have been detected as easily with a single six degree prism, base up or down before one eye, when the line would have been doubled; for the patient was asked to look at either the upper or the lower line of the three which insured that the image of the line in the other eye was beyond the fusion area. If the single prism had been used, the true line should have been fixed; but the result would have been the same in either case—the line not fixed would have inclined towards the opposite side. This condition was first named "insufficiency of the obliques," but a little later it was given the name cyclophoria, in harmony with the Stevens nomenclature which had been adopted by the Section of Ophthalmology of the A. M. A. at the Washington meeting in 1891. Later Stevens renamed it, for some unknown reason, "retinal declination." Whether under the one name or the other the condition is the same. In Fig. 7 the left eye shows plus cyclophoria; in Fig. 8 the right eye shows plus cyclophoria. If the middle line in

Fig. 7 had been seen by the right eye, the condition would be minus cyclophoria; and if the middle line in Fig. 8 had been seen by the left eye, it would have shown minus cyclophoria for that eye. The false line leaning towards the opposite side always means plus cyclophoria, while leaning towards the same side always means minus cyclophoria. In the former case the vertical axes have a tendency to diverge from the median plane of the head, while in the latter they have the tendency to converge towards this plane. To prevent this loss of parallelism between the vertical axes and the median plane of the head the right and left sixth and seventh fusion centers, as the case may be, send neuricity to their individual oblique muscles, compelling them into contraction to supplement their tonicity. The right and left sixth basal centers are the active ones in plus cyclophoria, while the right and left seventh basal centers are the active ones in minus cyclophoria.

Cyclophoria is intrinsic. It may exist in connection with compensating cyclotropia which is always found in nonparallel oblique astigmatics. In such a case the divergence or convergence of the meridians of greatest curvature will determine whether or not the correcting cylinders will bring relief from the cyclophoria. If there is plus cyclophoria (fifty times more common than minus cyclophoria) and the astigmatism has its meridians of greatest curvature diverging above, the correcting cylinders will bring great relief but will not cure; if these meridians converge above, the correcting cylinders will make the patient worse and to such an extent that she may not be able to wear the lenses. The reverse in all respects is true of a case of minus cyclophoria.

The weak obliques can have their tonicity augmented by rhythmic exercise. The means and method were first discovered and applied on May 17th, 1892, when the same might have been done in the latter part of 1890, at which time I discovered compensating plus cyclotropia in cases of non-parallel oblique astigmatism. From that time I had known and published that artificial oblique astigmatism would compel the same action of the obliques as natural astigmatism, and that in the former this action ceased at once on the correction of the astigmatism. The production of the astigmatism meant action, and the correction meant rest of the obliques. From this it was only one step to the exercise of the weak obliques and yet it took me nearly two years to take it. The production and destruction of artificial oblique astigmatism, rhythmically and not continued too long, was the method; the means was a pair of weak plus or minus cylinders set in circular rims so that they might be revolved in the arcs of distortion for the obliques to be exercised. Fig. 9 represents the frames containing plus cylinders for the exercise of the superior obliques.

In the cut the axes of the cylinders are at 90°. The notches shown in the lower temporal quadrants are graduated stopping places for the axes as they are being turned from 90° towards 45° for the right, and 135° for the left. The test object should be a white horizontal line on a black-board, or horizontal slot brightly illuminated. The strength of the cylinder should be $+ .50$ D to $+ 1.50$ D, rarely stronger. With their axes at 90° there is no distortion of images, hence no action of the superior obliques. Moving the axes to the notches marked 1, there is slight distortion, and correspondingly slight action of the superior obliques, when the cylinders are before the eyes. Raising the frames the obliques lapse into rest. The rhythmic lowering and raising of the frames at intervals of three seconds, promptly causes contraction and relaxation of the weak superior obliques. At the end of five minutes the axes should be turned to notches marked 2. There is greater distortion here, hence increased work on the part of the superior obliques. The rhythmic lowering and raising of the frames should now be continued three minutes. Lastly the axes of the cylinders should be placed at the notches marked 3. They now produce the maximum of distortion and command the maximum action of the obliques. The rhythmic lowering and raising of the frames should now be continued

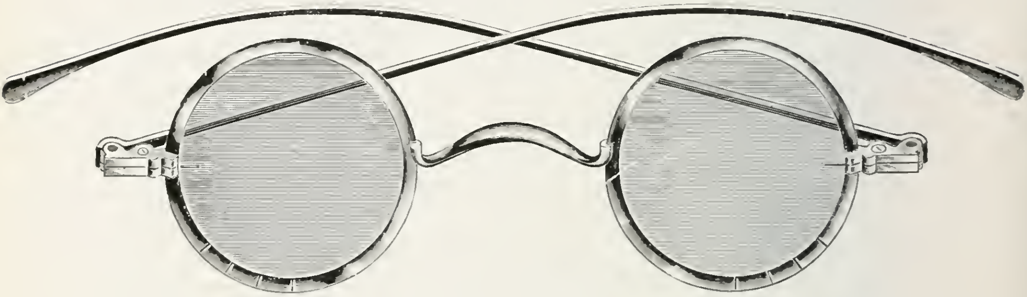


Figure 9. Exercise Frames for Superior Obliques.

only two minutes. A shorter time at first might be necessary because of fatigue. A longer period of exercise, at any time, might be hurtful. The rule here should be rhythmic contraction and relaxation, short of fatigue, as set forth in the study of exercise of the recti.

Fig. 10 represents the frames prepared for the exercise of weak inferior obliques, plus cylinders being used for the purpose.

If minus cylinders should be preferred, the frames shown in Fig. 9 would be for the exercise of the inferior obliques, and the frames shown in Fig. 10 would be for the superior obliques.

Both plus and minus cyclophoria can be cured by exercise. Progress is necessarily so slow that patients often fail to carry out the treatment, although it could be done at the home, without loss of time in waiting at the office.

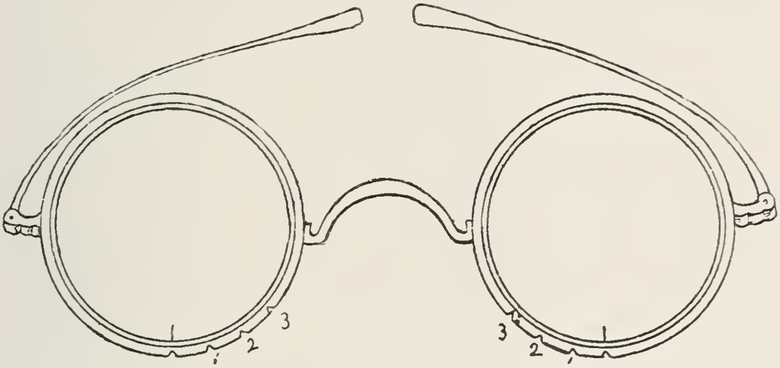


Figure 10. Exercise Frames for Inferior Obliques.

Weak cylinders, plus or minus, can be given nonastigmatic cyclophorics, with their axes so placed as to rest insufficient oblique muscles. They produce artificial astigmatism to which there are two objections: (1) images are rendered less sharp while being distorted; (2) the compensating cyclotropia interferes with correct orientation. If rest cylinders are given their strength should be .50 and their axes should be placed in the arc of distortion for the stronger obliques. If there is plus cyclophoria, and + .50 cylinders are used, the axis of the right should be at 135° and that of the left at 45°; but if minus .50 cylinders are to be used for resting the weak superior obliques, the axis of the right should be at 45° and that of the left at 135°. All this is reversed if there is minus cyclophoria. Rest cylinders for weak oblique muscles are a little less scientific than rest prisms for weak recti muscles.

Plus cylinders correcting a natural astigmatism can be slightly revolved, so as to interfere but little with the sharpness of retinal images and yet bring considerable, if not entire, relief from the cyclophoria. A wrong revolving would augment both the cyclophoria and the symptoms. If the cylinders are plus and their axes are diverging, they should be made to diverge more (2° to 5°) in plus cyclophoria, and should diverge less in minus cyclophoria; but if the plus cylinders have their axes converging, they should be made to converge less (2° to 5°) in plus cyclophoria, and should converge more in minus cyclophoria. If correcting cylinders are minus, the reverse of the above changes would be correct. This is the rule first formulated by N. C. Steele. The exceptions to the above rule apply when the axes of plus or minus cylinders are in the horizontal or somewhere between the horizontal and 45° above or below. The following is a universal rule for shifting axes of cylinders to help weak superior oblique muscles in plus cyclophoria:—The axes of plus cylinders in the upper half of the upper temporal quadrant, and the axes of plus cylinders in the lower half of the upper temporal quadrant should be shifted towards the central point of that quadrant; the axes of plus cylinders in the upper half of the upper nasal quadrant and in the lower half of the upper nasal quadrant should be shifted from the central point of that quadrant. In minus cyclophoria the very reverse would be the order of shifting.

In both plus and minus cyclophoria, when the correcting cylinders are minus, the reverse order of shifting for each condition must be observed.

In cases of esophoria, exophoria, or hyperphoria and cataphoria, to be operated on, any complicating cyclophoria may be cured by either the partial tenotomies or the shortenings or tuckings to be done. One single illustration must serve to show my meaning. A case of sthenic esophoria with hyperphoria of the right eye and cataphoria of the left, complicated by a known degree of plus cyclophoria. The first operation should be a partial tenotomy of the left internus including all the lower and central fibers. This would lessen the esophoria, would correct in part the cataphoria and most likely would correct the whole of the plus cyclophoria. The cyclophoria having been cured, any further tenotomies must be central. If all the plus cyclophoria has not been corrected and there yet remains some slight hyperphoria, the next operation should be a nasal-marginal-central tenotomy of the right superior rectus. Whether the second operation has or has not corrected the hyperphoria and the plus cyclophoria, an operation on the right internus for the remaining esophoria must be a central partial tenotomy. It is easy to know when.

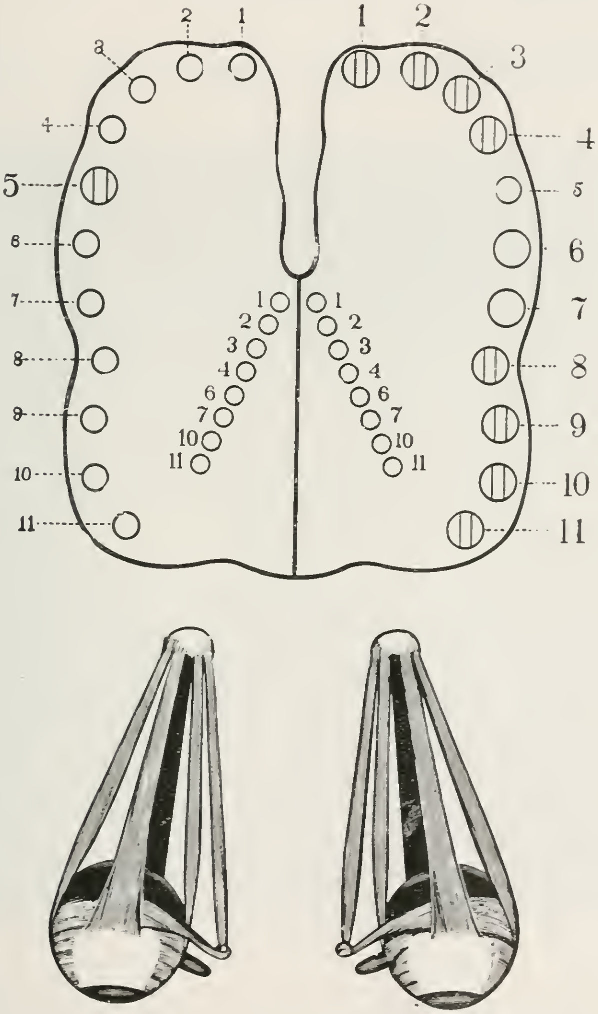


Fig. 11. Brain Centers Controlling Eye Muscles.

and when not, to do a marginal tenotomy or a marginal shortening in any given case. Without a complicating cyclophoria all tenotomies should be central and all shortenings or tuckings should be straightforward. When there is a complicating cyclophoria, certain tenotomies should be central and others ought to be marginal.

Since I have referred so often to brain-centers, conjugate and individual or fusion, I reproduce here in Fig. 11, a schematic representation of all of them. The conjugate centers are shown in the cortex and are marked by numbers, each controls two muscles, one belonging to each eye.

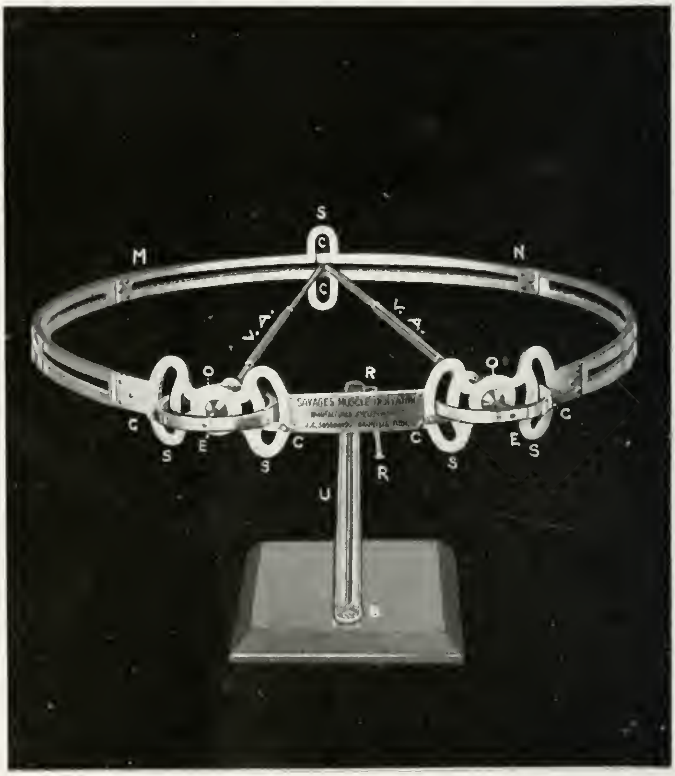


Fig. 12. Savage's Muscle Indicator.

On either side of the median line are shown the individual, or fusion, or duction centers, each numbered in harmony with the numbering of the conjugate centers. Each of these centers controls only one muscle, and they all exist in the interest of fusion.

In this paper only the borders of the muscle study have been touched, and yet I have gone far beyond the limit of space assigned me. Having said that the muscle study is easy of mastery, even in the privacy of one's own study-room, I may be pardoned by all, and even thanked by some, for stating how it can be done. The Muscle Indicator, shown in Fig. 12 is a silent but clear and convincing teacher.

It illustrates, and confirms, and makes clear and easy, every thing taught in Ophthalmic Myology (second edition) and in Ophthalmic Neuro-Myology. "There is no phase of a single ocular muscle or any combination of ocular muscles normal, abnormal or pathologic that it can not show."

All true knowledge of the ocular muscles is based on the fact that there is a binocular spacial field of view which contains a binocular pole, and binocular meridians and parallels, and that the existence of this field with its component parts depends on the fact that the center of the macula is the posterior pole of the eye. The two books named above are the only books ever published on the basis of the facts stated in this paragraph. The best teacher of these books is the Muscle Indicator.

At the Panama Pacific Exposition a $5,000 eye, so large that it would be too large for one of the famed Cyclops of old, will be one exhibit that Dr. Rauer will present, which will be part of the $25,000 exhibit of an electric company. The eye is six feet by four and will be looked into instead of looking out. Equipped with lenses, retina and muscles, the eye will reflect images of a large model factory erected in front of it. It is the purpose to show the destructive effect on the health of workmen of illumination that is either too dim or too glaring. When the light is dim the image seen by visitors is dim; and the varying effect of light will be shown by the sudden contraction or expansion of the pupil and muscles of the eye. It is not only intended to show the evil effect of badly lighted rooms on the constitution, digestion and nervous system of factory employes, but to demonstrate that it pays financially to light buildings properly. The basic idea of the exhibit is that good accessories are not matters of charity but of good business foresight.

UNANSWERED QUESTIONS CONCERNING HETEROPHORIA AND HETEROTROPIA.

BY LUCIEN HOWE, M. D., FEL. ROYAL SOC. MED., BUFFALO, N. Y.

This invitation from THE RECORD to join in the symposium on heterophoria and heterotropia seems to me not only an honor, but an opportunity.

It may be remembered that the Section on Ophthalmology of the American Medical Association appointed a committee a few years ago to report from time to time on new data collected in this field. A beginning has already been made. Some members of that section, it is true are so much engrossed in practice, that they cannot, or will not give time to any systematic inquiry; they want only "practical" work. Some of these men are generous in their offers of theories which the committee is obliged to decline with thanks—the stock on hand being already superabundant.

Fortunately, however, there are others—especially among the younger men who are not too much absorbed for real study. But they do not know where to begin. Too often, their time and energy is wasted on some question which was settled years ago, while important studies are neglected.

Therefore it seems not out of place for me, as a member of that Committee on the Muscles, to make use of the opportunity here offered to indicate, at least superficially, some of the questions in this department which still remain to be answered—with the hope that recruits may be enlisted. Willingness to co-operate in that way could be reported to me or to either of my colleagues on that Committee—Drs. Howard F. Hansell, or T. B. Schneideman, both of Philadelphia.

I. PATHOLOGICAL ANATOMY.

Let us begin then with some of the questions concerning the anatomy of the extraocular muscles, and it will add to clearness if we number each as we proceed.

1. What relation does the size of a given muscle bear to heterophoria or heterotropia?

We know that when an esotropia, for example, has existed for years the internus has been found hypertrophied, and the externus atrophied, but we do not know the lesser degrees of these changes in size, nor, in any case, what is cause, and what effect.

2. What relation does the line of the principal insertion of a given muscle bear to heterophoria or heterotropia?

We know that this line of insertion seldom corresponds exactly to the figures handed down in the text books, but we do not know what may be the effect of even a slight malposition of this line of the principal insertion on the position or movement of a globe.

3. What relation do the *"secondary"* insertions of a given muscle bear to either of these conditions—especially to heterotropia and operations for its cure?

These "secondary" insertions are simply the bands of connective tissue which pass from the tendon of each muscle to adjacent tissues before its insertion. They are seldom referred to in the text books, but can easily be seen even in coarse dissections, and many a surgeon has found them, to his chagrin. When making a tenotomy he has divided, it is true, the principal insertion of the tendon, has perhaps seen the white line of the section: then taking out the speculum and cleaning the eye he has found the deformity practically as great as before. But if he snips these secondary insertions—the right ones and to the right degree—the eye at once swings into the desired position. We have still much to learn of these secondary insertions. Nor is the pathological material so difficult to secure as may be supposed. For instance, any ophthalmologist on the staff of an institution for the aged, or especially for tuberculosis patients, has ample opportunities to work out exact diagnoses of forms of heterophoria, or of heterotropia, and later, from post mortem specimens to obtain facts which would outweigh innumerable theories. In view of the part which heredity plays in these phorias and tropias and other factors which might be mentioned, it is probable that anatomical peculiarities are vastly more important than the function of fusion, or than on some other causes to which attention is now directed.

II. ROTATION BY THE EXTRAOCULAR MUSCLES.

Let us pass next to questions concerning the action of the extraocular muscles. Here we may ask:

4. How can we best measure the extent and character of an arc of rotation by objective methods, especially with

(a) The modified Stevens phorometer,
(b) The improved perimeter,
(c) By photographing the rapidity of the lateral swing?

5. How can we measure the extent and character of such a rotation by the subjective methods?

6. How do either or both of these methods assist us in determining whether a given degree of heterophoria or heterotropia is of the *active* or of the *passive* type?

Perhaps a word of explanation is necessary concerning the terms active or passive forms of heterophoria or heterotropia, for the distinction is essential to a complete diagnosis. Thus the term esotropia simply indicates the position of a globe. Active esotropia means etiologically excessive adduction, though the abduction may be normal. Therapeutically it means cycloplegics, glasses, or tenotomy. Passive esotropia means etiologically insufficient abduction, though the adduction may be normal. Therapeutically it means perhaps medication, or fusion exercises, but usually advancement of the internus. This more exact diagnosis is therefore useful in heterotropia, and quite as important in heterophoria, though not always possible to make. To distinguish an active from a passive esophoria assists us in determining the strength of a glass, how it can be centered to advantage, or whether a given prism should have its base placed in or out.

These and many other unanswered questions of a similar kind give some indication of our ignorance of the extraocular muscles when acting alone.

III. ACTION OF THE INTRAOCULAR MUSCLES. (ACCOMMODATION.)

But if we advance a step further, we find that the extraocular muscles are most intimately associated with and dependent upon the action of the intraocular muscles. That opens a new and larger field. For example,

7. What amount of lenticular astigmatism is indicated by the irregular movements of the entoptic images during accommodation, when these movements are measured with Tscherning's phacometer? And what is the relation of this lenticular astigmatism to esophoria or exophoria?

Thus we have to deal with the complicated act of accommodation when it is normal, and also when excessive or insufficient. Each of these conditions affects an existing esophoria or exophoria. Therefore we must be able to measure these two anomalies of accomodation, and to answer such questions as the following.

8. How exactly can we measure even a slight spasm of the accommodation

- (a) By the approach of the near point?
- (b) By plotting the curve on a system of co-ordinates which shows the too tardy action of a minumum dose of atropin, or
- (c) By plotting the curve showing the too rapid action of a minimum dose of eserin?

9. How exactly can we measure even a slight paresis of the accommodation by reversing the processes just mentioned?

Thus we should take into account in a given case the accommodation which may be normal, or excessive, or insufficient, and the relation of each to a given degree of convergence which itself may be either normal, excessive or insufficient.

IV. RELATIVE ACCOMMODATION AND RELATIVE CONVERGENCE.

Nor is that all. The relation of accommodation to convergence, and the reverse, while most intimate and of supreme importance clinically, is not absolute. Accommodation varies somewhat with relation to a given amount of convergence, as convergence does with relation to accommodation. Thus of course, if we converge to a given point, the addition of concave glasses up to the limit of clear vision, reveals the positive part of the relative accommodation, and the addition of convex glasses reveals the negative part. The reverse process with prisms gives, of course, the positive and negative parts of the relative convergence.

Long ago Donders showed that for comfortable vision at the near point it was essential to retain enough of the positive part of the relative accommodation. We forget that this principle underlies our every day practice. Only we are more accustomed to estimates and guesses, than to exact measurements.

10. With the optometer made for these measurements, what is the positive part of the relative accommodation in esophoria of a given degree? What in exophoria? In hyperphoria? etc. And what is the negative part in each?

11. What is the positive part of the relative convergence? And the negative part?

Other similar questions involving degrees of ametropia suggest themselves.

V. MEASUREMENT OF THE FATIGUE CURVES.

We have known for more than a year how the muscles of convergence or of divergence can be made to trace their own story of fatigue with a pen on a revolving drum, just as that is done by the muscles of a frog's leg. But as yet, no clinical use has been made of this method. We still speak indefinitely of "eye strain" instead of measuring it, and plotting it in a curve. Moreover, a method has been found by which the fatigue of accommodation can be measured in a similar way. Therefore may we not ask questions such as these:

12. What is the fatigue curve of convergence in a given form and degree of esophoria or exophoria?

13. What is the fatigue curve of accommodation under similar conditions?

14. Which is the more important factor in a given case?

So far we have considered only the eyes themselves. But a still wider field is opened when we ask the relation of the so-called asthenopic symptoms to the processes of assimilation and nutrition. For example, are the headaches complained of by an exophoric patient due to the eyes, or due partly or entirely to hyper or hypochlorhydria—or to insufficient elimination by the kidneys, or otherwise—or perhaps to some change in the blood?

But it may be asked who ever thinks in practice of making all these measurements—most of them apparently so useless or absurd. Of course no one does at a first examination, nor later, if the conditions do not require it. When a patient comes simply "for glasses," we obtain only the essential data, make a provisional diagnosis, write a prescription, and go to the next one waiting. Nothing more is asked for, nor paid for.

But if that patient returns with complaints, then it behooves the conscientious practitioner to take up each factor in turn at visit after visit, if necessary, until at last the problem of that individual case is solved—if a solution is possible. It may be objected that too much stress has here been laid on measurements for diagnosis, and not enough on questions of operative treatment. That desire for the easy and the spectacular is one of the great causes of our ignorance. We have all been guilty of inventing instruments and operations. But until a diagnosis can be expressed exactly no one can know whether a given instrument or method of treatment is used upon the right patient or in the right way. In a word our present confusion of ideas in this department comes largely from neglect to answer to ourselves fundamental questions. We need first to obtain some adequate idea of our ignorance of heterophoria and of heterotropia, and then we need a body of patient, well trained, earnest students, each ready to take up some one small question—apparently insignificant and impracticable—and then work, work, as Goethe says "Ohne hast, ohne rast," for months or for years if necessary—until ultimately an answer is found—not as an opinion, but as a positive demonstration expressed in figures. And why should not this be done? The questions are many. Our committee has a bibliography arranged in a card catalogue of over two thousand articles on the muscles. The titles are indexed according to date and according to sub and sub-sub-divisions of the subject. It would be easy to indicate the appliances necessary for various measurements, and where descriptions of them could be found. Any one really in earnest and qualified would be started in his selected path, if others have blazed the way before. Even the path itself would be pointed out—and all for the asking.

Finally, it behooves Americans to do this. Although our first inspirations came from German and Dutch teachers, and although those fine traditions have been maintained by the Teutons, and by a few eminent colleagues today in France and England, still, it will be admitted I think, that American ophthalmologists in general take the lead in their methods of diagnosis and treatment of muscular anomalies. Shall we maintain that lead? If so, let each of us first recognize how much we do not know, and then quietly determine to find an answer to some one of the unanswered questions concerning heterophoria or heterotropia.

The Harvard Graduate School of Medicine offers a course in Ophthalmology to be given in May. The course includes pathology, refraction, clinical instruction, surgery, ophthalmoscopy, special application of the X-ray, applied anatomy and physiology, and selected topics in physiologic optics. This course is open only to advanced students.

REPORTS OF SOCIETIES

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of April 18, 1914.

DR. W. C. BANE PRESIDING.

Subconjunctival Injection for Corneal Ulcer.

Dr. D. H. Coover presented a physician who twenty-five years previously had lost one eye from infection, which in the other eye had left a dense corneal leucoma. Ten years ago the opacity had somewhat cleared under the use of thiosinamin, and the eye had been fairly useful until about six years back, when the patient came with a severe inflammation involving the whole cornea. Upon improvement an optical iridectomy had been done below. Two weeks ago the cornea began to break down near the center, and rapid spread of the ulcer seemed to threaten entire loss of the eye. A subconjunctival injection was made, containing 15 minims of 1:1500 solution of cyanide of mercury with one-third gr. novocain. There was a terrific reaction during which edema extended over the forehead and cheek, and the conjunctiva stuck out beyond the lids. After three days the conjunctiva was still so edematous that linear incisions were made, after which the swelling partly went down. The ulcer immediately began to fill in, and in six days was completely covered.

DISCUSSION.—Dr. Black had had a case of punctured wound involving cornea, iris and lens, in which the anterior chamber was filled with yellow organized pus. A week after two injections of cyanide of mercury the mass in the anterior chamber had entirely disappeared. But the eye later became worse again and had to be enucleated.

Dr. Patterson had used a 1:5000 solution with one per cent acoin, which produced less reaction and very little pain.

Congenital Absence of External Rectus.

Dr. W. H. Crisp presented two patients in each of whom there appeared to be a congenital absence of one external rectus muscle. The first patient was a woman of twenty-three years who had come for correction of squint. The history indicated that since birth the right eye had been incapable of outward rotation, although always regarded as the better eye. This eye had 0.75 D. of hyperopic astigmatism, and the left eye 4.50 D. With correction each eye had vision 5/7.5. The right eye could not be brought out beyond the median line, although movements were otherwise normal. There was distinct flattening of this eye at the normal site of insertion of the external rectus. The second patient was a boy of eleven years whose left eye had turned in since birth, although it fixed perfectly and had normal vision. The limitation of movement of this eye corresponded precisely to that of the right eye in the first patient, but there was no flattening of the globe. Neither patient had ever been troubled with diplopia. In the boy some cosmetic improvement had been got from tenotomy of the left internus, and the possibility of transplantation of a part of the superior and inferior recti to the normal position of insertion of the externus had been suggested as regards both patients.

DISCUSSION.—Dr. Black had found that on putting a red glass over the good eye of either patient, as soon as a moving light was carried beyond the point where the poor eye could fix on it, so that the rays of light no longer fell on the macula, the light was seen as red, although it had previously only been seen as white. With the red glass over the defective eye the light was seen as white in every direction.

Dr. Patterson had a similar case in a girl of seventeen or eighteen years, the left eye being affected. But this patient had diplopia.

Dr. Coover had shown a case some years ago in which after incision through the conjunctiva no trace of inferior rectus could be found.

Dr. Jackson had seen about half a dozen cases of congenital paralysis of the externus. He believed several eyes had been anatomically examined by other authors, and that in no case had a muscle been found. There had been no complaint of diplopia in any case he had seen, nor was he able to develop diplopia in either of three personal cases.

Congenital Inequality of Pupils and Palpebral Fissures, with Heterochromia.

Dr. W. H. Crisp presented a boy of sixteen years who had been referred for refraction on account of a generally distributed muscular tic. The left pupil was distinctly smaller than the right, the size in bright light being R. 2.5, L. 2 mm. The L. palpebral aperture was ordinarily 5 mm. in diameter, as against R. 6 mm. The right iris had some admixture of brown pigment on a blue ground, the left iris being perfectly blue. The boy was of retarded mental development, and was attending a school for defective children. There was decided inequality of refraction of the two eyes, the right being nearly emmetropic, the left having 2 D. of mixed astigmatism. The left pupil was very slightly encroached upon by the upper lid.

Atypical Retinitis Circinata.

Dr. Edward Jackson reported further concerning the case of tumor-like swelling at the macula, in a man of fifty-nine years, of which a colored drawing had been shown at the October meeting. The vision of the affected eye, which had been reduced to 1/15 pt., was now 5/6 pt. with correction. The macular area, which had been prominent 3 D. in the swollen region, was now level. There were large yellowish dots, partly confluent, forming somewhat of a wreath at the margin, and massed in the upper part of the affected area. The fovea was rather gray. Towards the nasal edge of the area was a pigment blotch one third d. d. across. The case was probably more of the nature of an atypical retinitis circinata than anything else. The patient had been on vigorous iodid treatment.

Ocular Pain from Abscess at Root of Tooth.

Dr. W. H. Crisp reported the case of a woman of thirty years who in spite of refractive correction had complained of persistent pain over the left eye. At the same time she was suffering from a painful condition in the left side of her neck and left arm which her physician had diagnosed as neuritis. The pain over the eye disappeared almost immediately after opening of a tiny abscess at the root of a crowned left upper molar tooth. The only symptom apparently connected with the tooth had been a slight occasional dull aching over the antrum, to which the patient had given almost no attention. The pain in the neck and arm disappeared in about twenty-four hours. On two occasions within a few weeks after the abscess was opened, the dentist began to fill the cavity which he had drilled in the tooth. In each instance headache came on after several hours, and was at once relieved by removal of the preliminary filling.

DISCUSSION.—Dr. Patterson had seen a young physician who had had double antrum empyema, and later began to have pain back of the mastoid and over the temple, which kept him awake at night. He was cutting wisdom teeth. Cocainizing of the wisdom tooth by the dentist stopped the pain at once. X-ray examination showed the tooth to be hooked forward in the root of the next molar. Permanent relief from pain was obtained after removal of the wisdom tooth.

Traumatic Internal Ophthalmoplegia.

Dr. Melville Black reported the case of a young man who had been struck on the head by a heavy scantling. The visual acuity of each eye was normal, but the right pupil was widely dilated, and there was absolutely no accommodation in this eye. The left pupil was slightly ectopic upward. It seemed possible that the paralysis was due to a small cerebral hemorrhage caused by the accident.

Albuminuric Retinitis.

Dr. A. C. Magruder reported the case of a young woman, primipara, whose urine had been regularly examined without finding any albumin until three days before delivery, when a large amount of albumin was present. Caesarean section was done. A week after operation the vision of the right eye was fingers at one meter, and of the left somewhat better. The amount of albumin present was then seven per mille. Both discs were swollen but there were no hemorrhages. Under eliminative treatment the amount of albumin had fluctuated between seven or eight and three or four per mile; and the vision got worse or better in proportion to the quantity of albumin present.

William H. Crisp, Secretary.

TRANSACTIONS PHILADELPHIA POLYCLINIC SOCIETY, APRIL 9, 1914.

"Reports of Serious Ocular Conditions Due to Dental Diseases." Dr. William Campbell Posey.

Dr. Posey reported two cases of ocular trouble in which the causal agent had apparently been an affection of the teeth. The first case, one of monocular retrobulbar neuritis, occurred in a young woman 25 years of age who had recently had the roots of the left lateral and central incisors crowned to repair the deformity occasioned by breaking off the bodies of the teeth in consequence of an accident. The nerves of the affected teeth had been carefully removed and the roots filled antiseptically. The ocular symptoms had appeared after an automobile ride in a sharp wind and were thought by Dr. Posey to have been occasioned by a retrobulbar involvement of the nerve in consequence of a periosteal inflammation emanating from the affected teeth. Other possible causal conditions were absent. Vision was reduced to counting fingers at 1 meter eccentrically, the reduction being due to a large absolute central scotoma. The temporal half of the disc was somewhat pale and the retinal veins were full. There was no neuritis. The fellow eye was normal. Rapid restoration of vision followed pilocarpin sweats, salicylate of soda internally and a blister applied to the temple of the affected side. Some dental applications were also made to the gums about the affected teeth. The patient passed from under observation at the end of a month, vision having been restored to normal and all symptoms having subsided.

The second case occurred also in a young woman, and consisted of a detachment of the retina in the left eye, which was apparently due to a long standing abscess at the root of an upper incisor upon the same side. The removal of the tooth caused the prompt disappearance of the sac, which had been palpable at the root of the tooth for several years previously, but brought no relief to the ocular condition, nor indeed did tapping the retina or prolonged rest in bed and the usual remedies ameliorate the ocular condition, the detachment still persisting as before.

Dr. Posey referred to the many ocular disorders contained in the literature apparently due to dental affections, at times in consequence of irritation of the terminal filaments of the fifth nerve, but often purely neurotic manifestations entirely coincidental and without the relation of cause and effect. Bruner's recent paper upon the relation of the teeth to the eyes was referred to at length and attention called to Lang's observation that in 215 cases of ocular disease observed by him which could be attributed to sepsis, pyorrhea was the sublying cause in 139 instances.

DISCUSSION. Dr. Leighton F. Appleton reported a case that he had had under observation for the last three weeks of a man who suffered a rather sudden reduction in sight in the right eye, and who showed haziness of the retina, with dilatation, exudation and hemorrhage along the lower temporal vein, but later involving the superior vessels as well, with hemorrhages in the retina, giving a picture of thrombosis. No history of lues or other constitutional disease could be elicited.

He was placed in the hospital and given sweats, with inunctions of mercury daily. Improvement seemed rather tardy. It developed later that he had been struck on the upper central incisors with a ball about five months previously, and that an abscess formed at the root of the left incisor, for which he had received treatment a short time after the injury. Wishing to know whether there was still any trouble at this site, he was referred to a dentist, who found an abscess at the root of the right incisor, which he drained and treated.

Following this, improvement in the condition of his eyeground seemed to improve more rapidly, and it seemed fair to assume that the dental abscess was the cause of this ocular condition.

Dr. Wendel Reber referred to three cases of Serious Ocular Conditions Due to Dental Diseases, all three of which were proved to be of dental origin. They were reported in "Dental Brief," for June, 1904.

"Spontaneous Absorption of the Crystalline Lens." Dr. William Zentmayer.

The group of cases of spontaneous absorption of the crystalline lens here related is of interest as it contains cases representative of the different conditions which may give rise to the antecedent dislocation of the lens. In all four instances the absorption occurred without the production of secondary glaucoma or an irritative iridocyclitis, and in all but one, useful vision was restored.

Spontaneous absorption of the lens rarely occurs with the lens in its normal position, or without a rent occurring in its capsule. Dislocation of the lens either into the anterior chamber or into the vitreous usually first occurs and such dislocation follows a weakening of the suspensory ligament of the lens through disease of the vitreous secondary to a choroiditis or cyclitis, progressive myopia or distension of the globe in hydrophthalmos. Atypical development of the zonule is the cause of congenital dislocation of the lens. Blows upon the eye often dislocate the lens, which may later undergo absorption, but such cases are not "spontaneous."

The cases here reported illustrate rupture of the capsule from congenital anomalies, weakening of the zonule from congenital glaucoma, and during the development of hypermature cataract. In the last variety there is often a contributing cause in an associated choroiditis and jarring of the body in coughing or jumping, or perhaps a blow upon the eye so slight that it went unnoticed by the patient. At this time I shall not give details of the cases, but mention only the important points in the history bearing upon the subject under discussion.

The first case was one of unusual interest aside from the condition under consideration. In April, 1894, a child 21 months old was brought to my office because of a cast in its eye and of the so-called amaurotic cat's eye appearance. The right eye was turned slightly up and strongly in, the pupil was semidilated, T. N. At the posterior pole of the lens there was an oval greenish reflecting opacity. This occupied but part of the pupillary area and through the clear periphery of the lens a prolongation backwards of a cord of white tissue could be made out. In the middle of this there was a red streak, probably the hyaloid artery still blood bearing.

Two and one-half years later there had been no change other than the development of a stronger degree of convergent squint. Five years from the time of the first visit he returned with laminated opacities in the posterior layers of the lens which later became a total cataract. Four years from this date he returned with absorption of the lenticular substance and a thickened capsule with a large rent in the anterior capsule. Through this there could be seen attached by the capsule remnants by a base of about 2 mm. a freely moving hyaloid sheath constricted for a short distance, then flaring out as it approached the disc, so as to hide all but its upper-inner segment. As the membrane approached the lens it was seen to bifurcate, one band going to the posterior capsule, the other turned nasalward and traceable to the region of the ora serrata. There was an area of choroidal atrophy, possibly an incomplete coloboma, at the lower border of the disc. H.= 9 D. V.= L. P. The other eye showed no anomalies.

The development of cataract in this case may have been due to the traction of the hyaloid structure upon the capsule of the lens and the subsequent absorption may have been due to rupture of the capsule from the same cause.

The second case was one which because of other features was remarkable. A man 47 years of age had a high degree of hydrophthalmos in the right eye. The left eye had been recently removed for absolute glaucoma. Twelve years before he had been told that he had a cataract in the right eye. Vision became reduced to light perception. Some years later vision was suddenly, in part, restored to it. The eye presents all the features of congenital glaucoma with aphakia. While the haze of the cornea prevents an accurate view of the interior of the eye, still not even a trace of the lens could be found. Vision with + 13 D.= 20/30 pt. T.= 90 mm. An Elliot operation was performed, reducing the tension to 10 mm. one month after the operation.

The third case was that of a compositor who came for the treatment of a severe iritis in the O. D. He said that he had lost the vision of the left eye from cataract many years before and had been advised to have the cataract removed. but that he never had had the operation performed. He believes, however. that the sight has improved somewhat. Examination showed an aphakic eye, with no trace of the lens. Vision with + 11 D. 16/10. The right eye was almost blind from a plastic iritis.

The fourth case was one in which Dr. Zentmayer had performed a successful cataract extraction upon the right eye some years ago. The fellow eye at that time showed a cataract somewhat hypermature. Two years later the patient returned. stating that the eye operated upon had gradually gone blind. but that the unoperated eye had much improved. In the operated eye there was a complete glaucoma and in the left the lens had disappeared, but there were a great many coarse opacities well forward in the vitreous. With the proper lens visual acuity was almost normal.

DISCUSSION. Dr. Posey said that the remarkable restoration of sight in those formerly blind could usually be accounted for by the cataractous lens slipping from its position in the pupillary axis into the vitreous. While, as Dr. Zentmayer had pointed out. the lens in such cases becomes absorbed. it more often happened that this did not occur. but that the lens mass remained and gave rise to irritation of the ciliary body. If absorption of the lens could be relied upon, the desirability of removal of dislocated cataractous lenses would not so often come into question.

W. Walter Watson, M. D., Secretary.

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. Harry D. Belt of Chicago died recently after a brief illness.

Dr. and Mrs. Frank Brawley of Chicago have returned from a visit to New York City.

Dr. Richard Reeve has resigned as Professor of Ophthalmology in the University of Toronto. He is succeeded by Dr. James M. MacCallum.

The South Baltimore Eye, Ear, Nose and Throat Charity Hospital has nearly completed building, which is provided for by bonds to the amount of $50,000.

Dr. and Mrs. John Edwin Brown of Columbus, Ohio, who were detained from reaching Petrograd by the war, were able to reach Stockholm, whence they sailed for home.

Dr. A. L. Marshall has resigned from the Superintendency of the Protestant Deaconess Hospital, Indianapolis, to enter the practice of eye, ear, nose and throat diseases in that city.

Dr. Wendell Reber of Philadelphia spoke before the Philadelphia Clinical Association, October 5th. The meeting was devoted to reminiscences by physicians who had returned from the European war zone.

Several public health organizations of Baltimore have organized a series of public lectures to extend through the winter. Among the subjects of sociologic interest to be discussed is that of eye diseases resulting from bad social conditions.

Further study of trachoma is being made in North Carolina and Kentucky. In the latter state clinics and lectures are being held, and several special hospitals organized in the mountain districts.

The First Annual State Meeting of the Wisconsin Eye, Ear, Nose and Throat Specialists under the auspices of the Milwaukee Oto-Ophthalmic Society was held at the Athern Hotel and St. Mary's Hospital at Oskosh, Wis. on October 8th. and 9th., 1914, with an attendance of 45 members.

The newly organized medical department of the University of Illinois (formerly the College of Physicians and Surgeons, Chicago) has the following Department of Ophthalmology:—Prof. Casey A. Wood; Associate Professor, Wm. E. Gamble; Assistant Professors, J. Brown Loring and E. K. Findlay; Instructors, Wm. B. West, C. C. Clement and F. D. Vreeland; Assistants, L. W. Whitmer, G. D. Theobald and E. F. Slavik.

It is announced that the next meeting of the Oxford Ophthalmological Congress will be held at Oxford on July 15th. and 16th., 1915. The discussion will deal on this occasion with the subject of industrial diseases and accidents. Mr. Sydney Stephenson has been elected Master of the Congress, in succession to Mr. B. W. Doyne appointed Past-Master. Mr. P. H. Adams (Oxford) has been appointed Deputy-Master and Mr. Bernard Cridland (Wolverhampton) Honorary Secretary. Colonel R. H. Elliot has joined the Council of the Congress.

This year the Trustees of the Ohio State University established a school of Optometry. The courses covered consist of algebra, geometry, trigonometry, physics, physiology and anatomy of the eye, theoretical optics, theoretical and practical optometry. Two years of high school work, or its equivalent, are required for entrance to this course which lasts two years. No diploma will be given, but a certificate showing work accomplished will be issued. The tuition fee is one hundred dollars per year in addition to a matriculation fee of five dollars. The bulletin states that no attempt will be made to make this a short-cut to a medical degree. Only as much anatomy, pathology, etc. will be taught as will enable the optometrist to refer intelligently those cases which it is beyond his ability to relieve.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *PaulGuilford(St.Luke's) *Casey Wood (St.Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm.E.Gamble(U. of I.) Wm H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

THE
OPHTHALMIC RECORD
A MONTHLY REVIEW OF THE PROGRESS
OF OPHTHALMOLOGY

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ORIGINAL ARTICLES

NEW OPERATIVE PROCEDURES FOR SHORTENING AND LENGTHENING MUSCLES.

BY RODERIC O'CONNOR, M. D., OAKLAND, CAL.

ILLUSTRATED.

At the request of the editor of the OPHTHALMIC RECORD the following paper is contributed to the symposium on "Ocular Muscles."

The principle involved in the shortening or advancement is entirely new; that involved in the graduated tenotomy is not new although the exact manner of application is, I believe, original.

The factors that operate against successful results in all methods of shortening or advancement are:—

(1) Constriction of tissues by the sutures or ligatures employed.

(2) Tension on the point of union by the operated muscle and its opponent.

(3) The anatomical formation of the ocular tendons with fibers parallel and loosely held together conducing to slipping of the tendon through a suture unless tied tightly enough to cause constriction.

(4) Stretching of the operated muscle causing paresis.

Constriction and tension have been considered to be necessary evils although known to be violations of all surgical principles relating to the union of tissues by the aid of sutures.

Constriction in itself is sufficient to produce sloughing of the constricted tissues. This sloughing produces a loosening which in turn permits the tendon to slip back through the loose suture loop. These sequelae are increased by the tension of the operated muscle and its opponent through their tone when at rest and their contraction when in action.

Because of these conditions it is usually advised to greatly over-correct in order to increase the chances of securing approximately the result desired. Also, to help out, it is frequently advised to perform tenotomy of the opponent of the operated muscle. This excessive over-correction, unless aided by a tenotomy of the opponent, is apt to produce over-stretching and paresis. The paralysis of the sphincter ani by stretching, as a preliminary to an operation for hemorrhoids, is a similar proposition.

That loss in the effect from one or more of the factors mentioned is constant can be very clearly shown by the following:—

(1) Reese states, in the description of his resection, that even the lower grades of squint cannot be corrected unless a point on the muscle substance is brought to the scleral insertion. In the case of an externus this would mean about 12 mm. of shortening or 60 degrees of theoretical effect. In descriptions of other advancements is often seen the advice to suture as close as possible to the cornea a point as far back as possible on the tendon which would mean about 15 mm. of shortening (theoretical) equal to 75 degrees. As such results are unknown loss *must* occur from one or more of the causes named.

It therefore is evident that if tension and constriction can be avoided, the third factor will become inoperative leaving only the factor of stretching to be allowed for by over-correction. Consequently the excessive over-corrections at present considered necessary will not be required.

In the following operation which I devised three years ago there are no constricting sutures nor is there any tension on the suture holding the muscle forward, and the amount of result is limited only by the length of tendon as all of it may be taken up. A maximum theoretical effect of 10 mm. is therefore possible (when working on an externus) equal to 50 degrees. This is sufficient and allows enough for over-correction purposes as the only uncertain factor is the one of stretching in the muscular portion, the tendon being inelastic.

The steps in the operation are as follows and they are described so minutely because I find that there is a general inability to grasp the principle and details of the method from my previous articles.

A. Exposure of the tendon.

(1) The conjunctival incision is curved, its summit being a little external to the center of the scleral insertion of

the muscle: the ends are opposite their respective tendino-muscular junctions and distant therefrom about 3 mm.

(2) This flap must be laid well back (Fig. 1-a) as much as possible by blunt separation to avoid hemorrhage.

(3) Undermine the conjunctiva toward the cornea (Fig. 1-c)to make a space for the central section of the muscle.

(4) The incision of the capsule of Tenon follows in a general way that of the conjunctiva and the capsule is laid back (Fig. 1-b) from the surface of the tendon by blunt dissection as far as possible. This separation may be more easily started a couple of mm. back of the insertion where it is freely moveable and not adherent to the tendon as at the insertion.

(5) It is important to have the entire tendon in full view in the subsequent steps therefore its margins must be free in their entire length from the insertion to the muscle substance (Fig. 1-d).

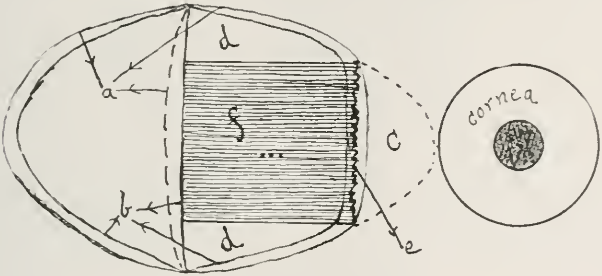

Fig. 1.

(a) Outlines of conjunctival flap.
(b) Outlines of flap in capsule of Tenon.
(c) Area of undermined conjunctiva.
(d) Sclera-clear view of and easy access to margins of tendon.
(e) Line of insertion on sclera.
(f) Tendon.

B. Tendon splitting.

(1) Separate a strip of tendon from each margin about 2 mm. in width and extending from close up to the scleral attachment out to the muscular portion. This must be done bluntly and an iris repositor makes a convenient instrument. It is important to have the tendon strips of practically equal width. (Fig. 2-a).

(2) Ligate the remaining central section of the tendon about 3 mm. from the line of insertion (Fig. 2-b) using 00 or 000 plain catgut. Cut one end close leaving the other long for traction purposes later. Cut this central section about 2

mm. from the insertion and lay it back out of the way. (Fig. 2-c).

C. Separate body of muscle from any possible adventitious attachments to the sclera.

D. Passing the suture destined to hold the central of the tendon in its new position.

(1) Suture is a number 1 triple armed black silk.

(2) Pass center needle through the center of the line of insertion from the scleral side outwards.

(3) Pass each end needle in a similar manner but at points opposite their respective ends of the central stump.

(4) Lay the needles and threads out of the way on the other side of the cornea.

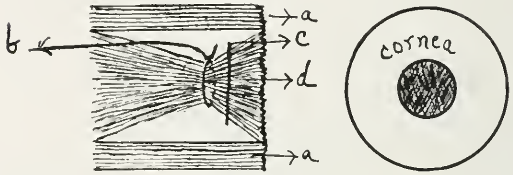

Fig. 2.

(a) Tendon strips separated.
(b) Ligature on central section. one end left long.
(c) Line of cut across central part.
(d) Scleral stump of tendon.

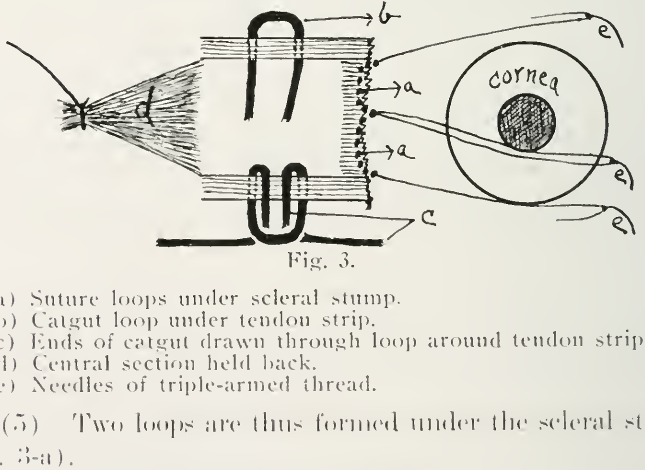

Fig. 3.

(a) Suture loops under scleral stump.
(b) Catgut loop under tendon strip.
(c) Ends of catgut drawn through loop around tendon strip.
(d) Central section held back.
(e) Needles of triple-armed thread.

(5) Two loops are thus formed under the scleral stump. (Fig. 3-a).

E. Shortening the marginal strips.

(1) Use 20 day Lukens catgut because it contains no irritating substance such as chromic acid that might cause a reaction.

(2) It must be made completely flexible by soaking in

tepid sterile water. This is very important for if the least stiffness is present the succeeding steps are made more difficult.

(3) Double the strand which should be about 10 inches long and pass the center loop under one marginal strip using a small hook to help draw the loop under the strip. (Fig. 3-b).

(4) Draw the two ends through the loop (Fig. 3-c) and pull down fairly snugly around the *center* of the strip thus making a double half hitch. It is *very important* to have the loop in the center for, if too close to the line of insertion, there may not be enough length of tendon to make the loop on that side.

(5) Arrange the ends as shown in Figure 5-a for if crossed as shown in Figure 5-b the next step cannot be accomplished properly.

(6) *Straighten* the catgut by drawing the ends in *opposite directions* whereupon the double loop will be transferred and now appears in the tendon the gut being straight. (Fig. 5-c).

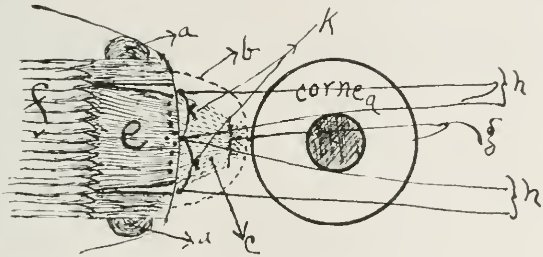

Fig. 4.

(a) Bunches in marginal strip made by the shortening.
(b) Outline of area of undermined conjunctiva.
(c) Central section drawn under conjunctiva toward cornea.
(d) Edge of conjunctiva.
(e) Tendon.
(f) Muscle.
(g) End of ligature on central section leading to point of emergence of needle from conjunctiva.
(h) Ends of two sutures made by cutting the three needles off the triple-armed thread and showing their points of emergence.
(k) Shows these sutures tied.

(7) The assistant must hold the catgut taut during the succeeding steps.

(8) The two tendon loops are slid into *close contact* with each other by pinching with iris forceps. This is *very important* for it serves to take the slack out of the catgut and thus prevents the re-transfer of the double loop back to the catgut.

(9) These loops are held in this close contact by a 00 or 000 catgut ligature (20 day) placed as shown in Figure 5-c (the white knot). It is not tied tightly for it is not intended as a suture but merely to prevent a re-transfer of the double loop. Cut ends close.

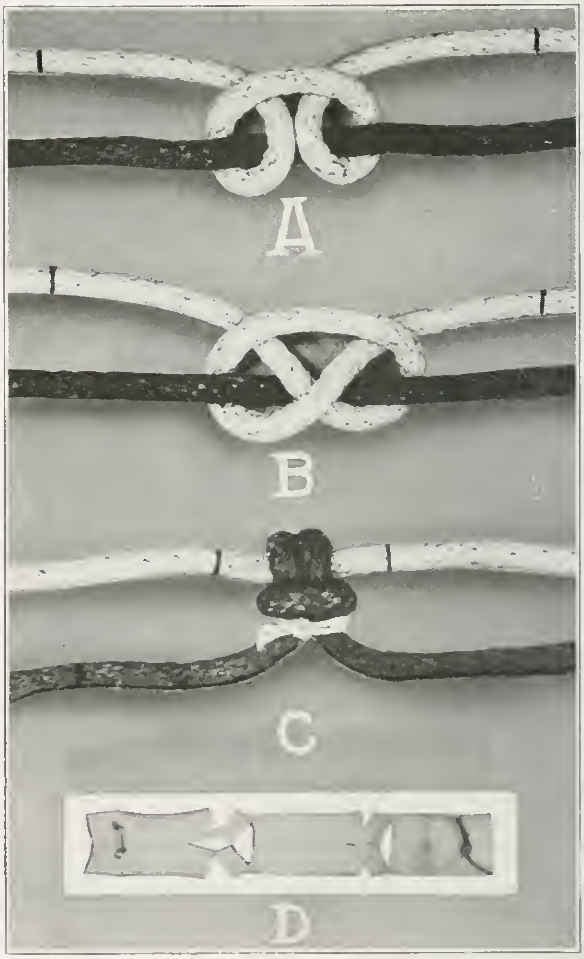

Fig. 5. Method of Transferring Loop to Tendon.
C. Graduated Tenotomy.

(10) Cut ends of large catgut as shown in Figure 5-c at the black lines on each side of the loop which shows diagramatically the appearance of one marginal shortening completed.

(11) Shorten the other marginal strip.

F. Suturing the central section in new position.

(1) Thread a needle on the ligature and pass it through the undermined conjunctival flap near the cornea and from below outwards. Traction will now draw the tendon forward into this pocket, and it is to be held in this position by an assistant while the holding sutures are being passed.

(2) Pass center needle of triple armed thread through the center of tendon from its under side and at a point approximately the same distance back of the insertion as the margins are shortened, thence out through the conjunctival flap about 1 mm. from its edge. (Fig. 4-n).

(3) Pass other two needles through the conjunctival flap at the proper places and remove the needles leaving two sutures which are tied (Fig. 4-k) but not so tightly as to cause constriction of the tissues. Cut ends close. The central section is now shortened and held against the original insertion *this point* being *free* from *tension unless the shortening exceeds that of the margins.*

G. Suture conjunctival wound including capsule of Tenon. Usually three or four sutures are necessary.

H. Bandage the one eye for two or three days for protection only.

To repeat—the points essential to success are:—

(1) A clear field of operation with the entire tendon in view.

(2) Placing the catgut loop the proper distance from the insertion.

(3) Sliding the tendon loops into close contact and retention in that position by the ligature of fine catgut.

REMARKS.

(1) There is no constriction in the marginal shortenings which are by loops not sutures. These loops of tendon constrict the catgut not themselves.

(2) The suture holding the central section is free from tension—the marginal strands taking the full muscle pull even when in action.

(3) For these two reasons there can be no loss of effect through slipping or through cutting and sloughing of sutures.

(4) Before the catgut can be absorbed the central section is firmly united to the sclera.

(5) The "bunch" is not large.

(6) The effect is necessarily straight forward therefore no torsion or vertical deviation can follow.

(7) There is a *definite shortening in the inelastic tendon* equal to twice the circumference of the catgut used plus the length taken up by the overlapping and thickness of the marginal strip.

(8) The amount of shortening may therefore be varied by

(a) the size of catgut.

(b) the width of tendon strip.

(9) The tendon shortening does not, of course, represent the total for the muscle fibers are elastic and must stretch a variable amount depending on the power of the muscle itself and on that of its opponent. *This therefore is the only unknown quantity in this operation.* So far as I can judge from my 14 operations the final effect is approximately half the theoretical—understanding of course that in none of my cases have any means been employed to help such as tenotomies, binocular bandaging. It is likely that a much closer approach to the theoretical effect could be secured by the aid of a tenotomy of the opponent. It is my desire to work up the method so as to do away, as far as possible, with tenotomies. However I believe those cases due to actual contracture of a muscle will require a partial or complete tenotomy as the muscle advanced would probably be unable to overcome the contracture of its opponent and would stretch.

(10) This can be done as an office operation as shown by practically all my cases but especially so by the 4th which was one requiring a general anesthetic. This is so because the marginal strands can stand the same strain after operation as before. To determine this positively I operated on a number of muscles of the pig's eye. After shortening a strip I would apply force until rupture occurred and in every case it took place at the tendino-muscular junction and without affecting the point of shortening. If Howe is correct in stating that the internus has a lifting power of but one ounce it is clear that by no possibility can the point of shortening be affected by the full normal action of the muscle plus that of its opponent.

(11) This splint principle can be used in connection with almost any of the present types of operations for:

(a) the central section may be resected, tucked or actually advanced by the aid of scleral or other sutures.

(b) a central band say 3 mm. wide can be shortened and the lateral sections handled as in Worth's and similar methods.

(12) If experimental work, which I hope to carry out in the near future, will show that the marginal shortenings are permanent even after absorption of the catgut then this method can be utilized to correct torsions as follows:

(a) one margin can be shortened the other left untouched.

(b) both can be shortened but one more than the other by using different sizes of catgut.

(c) one margin may be tenotomized the other shortened. This would be the equivalent of Steven's "extendo-contraction" with the "contraction" a closer approach to certainty.

(13) Size of catgut. The number of operations so far are too few to allow of any definite statements along this line. Corrections of 15 degree squints have been secured with number 3 Lukens gut which measures when dry about $^3/_4$ mm. in diameter; of 20 to 30 degrees with number 4 gut measuring about 1 mm. Twice the circumference of this last is about 7 mm. and the over-lapping of the tendon will probably add 3 more mm. to the effect. I have tried to determine this by shortening a strand of number 2 gut ($^1/_2$ mm. in diameter) with another of the same size and found that it shortens 10 mm. It is therefore evident that experience only will settle this point but it must be remembered that in my cases no tenotomies were done.

Case Records.

Case 1.—M. G., a Mexican laborer, who was operated as a test case merely for cosmetic purposes, as the deviating eye was blind, the result of injury incurred some years ago. The deviation was between 10 and 15 degrees of arc measured on the perimeter. The case was especially suitable for test purposes because the practicability of the technic and the immediate effect could be determined without any danger to the eye or to the vision. Up to the hour of the operation he was engaged in painting the ceiling of the operating room. The operation was done under local anæsthesia, a bandage was applied only to the operated eye, and he was allowed to go home. The next day he resumed his work on the ceiling and continued it till he left the fort five days later. The second night after operation he went on a drunk and raised such a disturbance that it became necessary to confine him in the guard-house. In spite of all these severe conditions there was no slipping at the seat of attachment, which was all the encouragement that I needed, for I could not imagine any harder tests being given. This case has been seen recently and the cosmetic effect is still satisfactory to him although there has been some diminution in the effect since the operation over two years ago.

Case 2.—W. H. B., one of concomitant exotropia. First examination showed the following condition: Vision 20/20 each eye, with a low degree of hyperopia in each eye; right hyperphoria 1°; no cyclophoria; exotropia 15° by the perimeter but fused flames with prism 19° base out—this being due to false projection, the result of a tenotomy done on the left externus about a year before. Operation on the left internus was done on February 19, 1913. After the operation only the operated eye was bandaged, his actions were in no way restricted, and he was returned to duty on February 28th. Up to the above date his eye showed no deviation to the cover test, but convergence for objects within the reading distance was defective. However, at this operation, it was not desired to secure more than half the final correction, and upon his departure he was told that another operation would be necessary in several months, or after his eye had settled down to its permanent position. He returned for the second operation on August 10, 1913, the condition at this date being as follows: false projection still apparent, also exotropia except upon effort when the eyes could be brought to the parallel position, convergence poor, vertical orthophoria, no cyclophoria, perimeter showed about 5 to 10 degrees of deviation but the large disk in its center interfered with proper placing of the observer's eye, therefore this measurement is *not* accurate. He stated that since the first operation it has been easier for him to look toward the right, probably because the left internus became stronger than the right. The second operation was done on August 11, 1913, being an advancement of the right internus. The technic was varied a little in that a No. 0 Lukens 20-day gut was used with a No. 3 of the same make, the smaller being tied to retain the tendon loops and the larger being cut off. This reduced the size of the knot very much. The immediate result was a marked convergence. On August 18th, seven days after the operation, there was an esophoria of 7°, this being brought out by the red glass without which there was no diplopia. Upon the removal of the red glass from before one eye, he stated most positively that the two white lights rapidly approached each other and fused into one, thus proving the presence of binocular single vision. In addition, he states that he can distinctly "feel" that he sees objects singly with both eyes. It will be noticed that after this operation his diplopia became homonymous, the false projection having disappeared.

On August 30th, the date he left the hospital, his condition was as follows: convergence to tip of nose, binocular single vision, no deviation by cover or perimeter, rotations normal in every direction, and external appearance normal. The explanation of this man's prolonged stay in the hospital on each operation is that he was sent to this hospital from a border station for treatment, and could not be sent out till he was ready to perform full duty.

Case 3.—G. E. M., internal squint as long as he can remember. Condition on first examination: Vision O. D. 20/15+ —this being the fixing eye: O. S. 20/30—1. Muscles—right hyperphoria, 4°; left cataphoria, 1°; esotropia, 22° each eye—no cyclophoria—rotations normal inwardly—outwardly 50° with right eye and 40° with left. Refraction under atropin:

O. D. + S. 1.50 with + cyl., .25 axis 90 = 20/20 +
O. S. + S. 1.75 with + cyl., .50 axis 105 = 20/30 +

Eye grounds and media normal.

Left externus advanced on March 1, 1913, the technic being the same as the second operation on Case 2. March 4th there was 5° of esophoria which had increased on March 9th to 7°. Evidently not enough tendon had been taken up to make a full correction, but this was not desired as I wanted but half in each eye. On March 18th the rotations were 50° outward in each eye, the left having gained 10°, bringing it up to that of the right eye. Left hospital on this date, the eyes being almost straight to outward appearances especially when wearing his glasses. He was directed to wear them all the time and to return in several months as another operation would certainly be necessary.

He was not seen again till September 7th. The condition had changed but little although there was distinct resetting outwards to the cover test. He had diplopia and false projection so that an accurate measurement with the phorometer could not be secured, and my perimeter does not permit of accurate measurements near the 0 point on account of a large disk. With his glasses he had binocular single vision up to 17 inches from his eyes. At greater distances he had diplopia which, however, did not bother him very much. I learned that he had not followed my instructions in regard to wearing the glasses constantly.

He refused absolutely to permit operation on the other eye, being satisfied with the cosmetic result from the first, although informed that the result was incomplete and could easily be made complete by another operation. The effect from my standpoint was all that could be desired, but nevertheless I am disappointed in not being able to report it as a complete case.

Case 4.—M. S., age 14. Has had an alternating esotropia since babyhood. This case I saw first in 1907, at which time she had 15° squint with 2.75 diopters hyperopia in each eye. Stereoscopic tests at that time showed the existence of binocular fusion. On May 29, 1913, the condition was exactly the same, there being vertical orthophoria and no cyclophoria.

Advancement as in Case 3, on June 13th, under ether anaesthesia because of an extremely nervous temper. Upon recovery from the anaesthetic she was taken twenty miles to her home in an automobile, wearing over the operated eye only a protective patch. At the operation only a very narrow band of tendon was looped as a complete result was not desired in the one eye. She was not even seen again till July 11th, when I learned that there had been no pain whatever at any time after the operation. At this date she presented the following condition: esophoria 4° with red glass, but fusion upon its removal. On August 7th, esophoria 1° with red glass and fusion of even the red and white images. No hyperphoria or cyclophoria. One catgut knot still evident but causes no inconvenience and the eye is practically white. The result in this case was complete from the one operation, being more than was expected or even desired. I have seen her a number of times since, casually, and there has been no loss in the effect that is apparent to the naked eye.

Case 5.—Operated on at the Knapp Memorial Eye Hospital through the courtesy of Dr. Torok whose patient she was. Rose K., 15 years old, squinted since her 4th year since which time she has worn glasses. Correction is plus sphere 4 with plus cylinder 1 axis 15 each eye. Fixes with left eye by preference although is able to fix with either. Vision 20/100 with right eye and 20/30 with left using her correction. Rotation outward on perimeter 40 with right eye and 50 with the left in both with much difficulty; deviation measured about 33 degrees on the perimeter. Operation Sept. 4th on the right externus using No. 4 gut. Left hospital on the 6th the bandage having been removed. Condition at this time:—phorometer shows 3 degrees of esophoria but she is able to fuse the red and white images with the plain red glass test. Sept. 11th the condition was the same but the eye was almost white and practically no bunch. Sept. 18th—stitches removed, orthophoria, showing a gain of 3 degrees in the preceding week. I figure that the operation corrected about 25 degrees and the glasses about 8, no tenotomy being done on the opponent.

Case 6.—Operated on at same hospital through the courtesy of Dr. Arnold Knapp. Margaret K. 9 years old, has squinted since babyhood and has been wearing glasses (plus sphere 4) since her 4th year. Rotations equal in each eye, also the vision; 50 degrees of concomitant esotropia. Operation Sept. 9th both external recti being shortened at one sitting using No. 4 gut. Sept. 18th stitches removed. Sept. 21st eyes getting white and swelling nearly gone. Cannot understand diplopia tests but eyes are practically straight behind her correction, certainly the deviation does not exceed 5 degrees consequently about 40 degrees of result was secured.

Case 7.—Operated at Wills Eye Hospital, Philadelphia through the courtesy of Dr. Schwenk, whose patient he was, a man about 40 years of age with an alternating exotropia of 50 degrees the vision being equal in the two eyes. The left internus was shortened without difficulty using No. 4 gut. With such a degree of squint it was not expected to correct more than half and that the other internus would require operation later. The date of the operation was Sept. 24th and the following quotation from a letter from Dr. Zentmayer gives the condition on Oct. 8th:—"The result in the case of divergent squint which you operated upon for Dr. Schwenk is very good indeed. I have not studied it but on inspection the visual axes appear about parallel." The effect must therefore have been approximately 40 degrees.

Case 8.—Operated upon at the Wills Eye Hospital Sept. 24, 1914 through the courtesy of Dr. Zentmayer whose patient he was, boy 12 years old with 18 degrees of concomitant esotropia; left eye somewhat amblyopic the vision being 20/100. Left internus shortened using No. 4 gut. The loops formed perfectly and the tendon was shortened properly and yet the total effect was not more than 5 degrees. I can only explain this on the ground of stretching of the muscular fibers or of paresis which I hoped might be only temporary but Dr. Zentmayer states in his letter that three days after the operation the boy developed a gonococcal conjunctivitis with deep wound necrosis so it will not be known what was the cause of the poor immediate effect. I think in similar cases in future I will perform a graduated tenotomy (to be described later) on the opponent to relieve any possible stretching.

Case 9.—Operated on at the Episcopal Eye and Ear Infirmary, Washington through the courtesy of Dr. W. T. Davis. Concomitant esotropia 20 degrees, left eye amblyopic (15/200). Left externus shortened using No. 4 gut and securing an overcorrection of about 10 degrees—the external deviation being quite marked. On October 16th, three weeks after the operation Dr. Davis reported the result to be on that date one of "perfect correction" by which I suppose he means orthophoria.

Case 10.—Sgt. L. This was one of partial paralysis secondary to fracture of the base of the skull and was of about one year's standing. He would have been a very interesting case to study in detail as there was in addition a partial facial paralysis and some mydriasis. It would appear that the center for conjugate motion to the right was affected because while there was an external rotation of 40 degrees by the right eye with the left closed, there was but 8 degrees binocular fixation to the right before the appearance of diplopia. The external rotation of the left eye was 53 degrees so that the right was actually paretic about 13 degrees. The annoyance caused by the diplopia was excessive. The operation was done on Sept. 27th at the Walter Reed General Hospital, Washington through the courtesy of Majors Buck and Halloran whose patient he was. The object desired was to increase the strength of the right externus the equivalent of 13 degrees and not to correct a squint as there was none when the eyes were in the primary position. A number three gut was used. The following is the immediate result as given me by Major Halloran under date of Oct. 16th twenty days after operation:—"The old Sgt. L. is tickled to death over his result as he has no more diplopia and he seems to have about 50 degrees of external rotation (O. D.)—that is an increase of 10 degrees."

Case 11.—This and the next case were operated on at the same place and time as case 10. It was one of 20 degrees concomitant esotropia the left eye being used by preference as the fixing eye its vision being 20/15 while that of the right eye was 20/20. The right externus was shortened using a number 4 gut with an immediate and marked over-correction and production of an evident external squint. The following from Major Halloran's letter of Oct. 16th. shows this case to have been a failure in that the operative effect did not last long enough for healing to take place. "I measured his squint on October 8th and figured it to be about 15 degrees, and to-day I went over him again and got 13 so it is between those two. If I remember correctly he was slightly over-corrected at first but about the third day after the operation when washing out the eye I noticed that the squint had returned. The tendon must have stretched because the two lumps are present where the strands were doubled on the catgut. I am going to do a tenotomy to-morrow on the internal rectus and see if that will help." So that on the 20th day the effect was only 7 degrees of correction. I have no doubt that this case would have gone the same course by any method of operation that did not include a tenotomy of the opponent. I can explain the result only on the ground of stretching of the muscular portion in view of the fact that the points of shortening in the tendon remained intact.

Case 12.—This was one of 15 degrees concomitant esotropia the right eye fixing—its vision being 20/20 while that of the left was 20/50. The left externus was shortened using a No. 3 gut the immediate effect being the same as case 8—that is practically nil—which did not change during the process of healing, so it was not, as I had hoped, one of temporary paresis from stretching but evidently a permanent stretching.

Summary of operations. Out of 14 operations on 12 cases 12 were entirely successful as to immediate results but in one of these the effect was mostly lost. In the other two cases the immediate effect was practically nil. In similar cases in future I would at once perform a graduated tenotomy to be described below in order to relieve the shortened muscle. The result such as occurred in No. 11 could not have been foreseen and I consider that case to be really a greater failure than either 8 or 12, as these could have been, in all probability, converted into successes by the aid of a tenotomy.

When I began to operate on the ocular muscles I was greatly impressed by the arguments advanced in favor of central tenotomies, and as a result my first four or five tenotomies were central. However, through lack of skill, they were performed, not through the small incision advised by the advocates of the method, but through one large enough to expose the full width of the tendon to view and the *extent* of the *tendon cuts* could be *seen instead* of *felt*.

The results were disappointing being characterized chiefly by the absence of result. The last case operated on by this method was of 4 degrees (prism) exophoria in which but 2 degrees of correction was secured although but two or three fibers of tendon were left uncut at each margin. The natural inference was that the advocates of this method inadvertently did complete tenotomies when the results claimed were obtained.

At any rate the method was given up and an attempt made to devise a method that would permit of graduation in effect from that incident to a real central tenotomy up to that obtained by the usual complete operations.

The following operation was devised in 1908 and has been used since in many cases with most excellent results. The lowest degree corrected was one of 6 degrees (prism) exophoria, which was over-corrected at the operation to 2 degrees of esophoria, but shortly afterward became orthophoric and when seen last three years later was still orthophoric. The highest error corrected was one of 25 degrees without an advancement of the opponent; this result however necessitated operation on the pair of muscles. In one case it was utilized in connection with an advancement and permitted a correction of 25 degrees in the one side.

However in the future this operation will be used only as an aid to my shortening and in low grades of heterophoria with symptoms indicating operative interference.

Steps in the operation are as follows:—

A. Expose the tendon and its margins clearly as described in the advancement operation.

B. Split the tendon by blunt separation along its center line from insertion to the muscle fibers.

C. Perform a real central tenotomy as close as possible to the scleral attachment leaving only four or five fibers at each margin.

D. Test with phorometer for the result.

E. Make lateral cuts as shown in Figure 5-d about four or five mm. back of the central cut. The effect from these cuts will not appear till after passing the last fiber left uncut by the central tenotomy because before this point is reached there are fibers going through that are uncut and they are strong enough to take the action of the muscle. From this point on the effect increases rapidly as the center of the muscle is approached. This part of the operation must be done carefully, cutting, in cases of phoria, but a couple of fibers at a time on each margin and testing for effect before the next cut. In cases of tropias the maximum length of cuts may be made at once as there is no danger of an over-correction and because the effect of a complete tenotomy is desired.

F. One point must be noted. As soon as the central cut is made it will be seen that this portion of the tendon drops back in a half circle effect. Then in making the lateral cuts they must incline back more or less parallel to this half circle to get them to cut the tendon fibers at right angles to the uncut tendon.

Remarks.

1. The effect can be straight back or by varying the length of the cuts in the proper direction correction of torsion defects may be made.

2. Care must be taken not to separate the tendon fibers for the gradation of the effect depends upon maintaining the connection of the parallel fibers in that portion between the lateral cut and the central tenotomy cut. It is the adhesion between these fibers that gives the "guying" effect and if this adhesion is destroyed by manipulation the operation becomes simply a complicated complete tenotomy.

3. The result can be quite accurately graduated at one sitting thus avoiding the repeated operations of the ordinary graduated tenotomies.

4. A maximum set-back of about 5 mm. can be obtained which would theoretically correct 25 degrees of arc at the rate of 5 degrees per mm. Of course this is not obtained unless an advancement of the opponent is done but it shows that the effect of an ordinary complete tenotomy is possible under similar conditions.

I believe the following principles in the treatment of squints to be mechanically and surgically correct and therefore try to follow them as closely as possible.

1. Divide the effect between the pair of muscles involved in proportion to the degree of involvement of each. Suppose a case of 30 degree internal squint with external rotations of 35 degrees in the right eye and 45 in the left. The aim would be to secure 20 degrees correction by operation on the right eye and 10 by operation on the left thus balancing the muscular power and securing a normal field of binocular fixation. Of course where one eye is blind or practically so this would not apply.

2. In order to secure a balance of strength advance or shorten the weaker muscles.

3. Reserve tenotomies for use only as an aid to advancements or shortenings and never do a complete tenotomy together with an advancement of the opponent except when one eye is worthless from the standpoint of vision and only a cosmetic result is desired. The opponent of a paralyzed muscle should not be cut as a matter of course.

4. The interval between operations should be long enough to determine the permanent effect of the last one. This can be done by repeated examinations at definite intervals until several give approximately the same findings.

CONCERNING THE USE OF INVISIBLE BIFOCALS IN THE TREATMENT OF CONVERGENT STRABISMUS (ESOTROPIA) IN LITTLE CHILDREN.*

BY WENDELL REBER, M. D., PHILADELPHIA, PA.

Esotropia in children under seven years of age is still accounted for in various ways by various authors. Some cling to the Donders doctrine pure and simple that vicious accommodative habits are entirely responsible for the abnormal convergence of the vertical axes. Others believe with Worth that defects in the fusion faculty or even complete absence of this faculty is the main difficulty, and still others hold that faults in the development or insertion of the extraocular muscles is the most frequent cause of esotropia.

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Every serious worker at this subject will admit the following postulates:

1. That a certain percentage of all esotropes under seven years of age lose their convergent strabismus under the influence of a correct refraction conforming to Donders "accommodative strabismus."

2. That a certain percentage of esotropes under 7 years of age are practically emmetropic or even myopic, so that this class is not explainable on the basis of Donders hypothesis.

3. That a certain percentage of every young esotropes exhibit congenital paresis or palsy of one or more of the extraocular muscles resulting in the usual clinical picture of esotropia. These are often overlooked.

4. That a certain very small percentage of very young esotropes are the subjects of faults either in the development or insertions of the extraocular muscles leading to the clinical picture of strabismus convergens.

5. That a certain small percentage of young esotropes are the subject of fine ultra-ophthalmoscopic changes in the retina or optic nerve of one eye which lead to the clinical picture of esotropia.

As this communication has to do with functional esotropia only, the last 3 classes (postulates 3, 4, and 5) fall out of consideration as they are, to our way of thinking, amenable to operation only. Functional strabismus arrays itself in 3 classes, namely:

(a) Pure accommodative strabismus-(Donders).

(b) Pure afusional strabismus-(Worth) in which the fusion faculty is entirely absent. These cases are reasonably rare and frequently come to operation.

(c) A combination of a and b, the hybrid type, represented by a weak or imperfect fusion faculty complicated by a high grade unequal refractive error. This in our judgment is by far the most frequent type of esotropia in both private and hospital work. It is the type that oftimes taxes us to our uttermost in our efforts to straighten out the visual axes without resort to operation.

If the fusion faculty be only weakly established by the end of the 2nd year of life, it is quite thinkable that a high grade unequal refractive error may easily prove an obstacle to the firm establishment of the function of binocular stereoscopic vision. During the 3rd year of life little children generally become much interested in picture books and play with small objects. The accommodative apparatus is thus put upon much strain and may become so vicious in its overaction as to disturb the visual apparatus enough to upset or even set aside the fusion faculty. In other words, with a weak fusion faculty the accommodative apparatus of the eye easily falls into vicious habits. Our task then is not only to train the fusion faculty but to so put the entire accommodative apparatus completely at rest that the vicious habits it has fallen into will be entirely broken up.

The correction of these vicious states of the accommodative apparatus have been made up to the present time by the use of practically full corrections and the continuous use of atropin in one or both eyes for one to three months after the glasses were put on. About 3 years ago while pondering this phase of the strabismus question it occurred to me that if we could sometime secure good results in high esophoria (8 to 15 degrees) by adding anywhere from plus one to plus three sphere to the distance-correction to be used in near work (to suppress accommodative overactivity), it might be worth trying in the functional strabismus of children; it was, in fact, carrying the idea to its logical sequence.

It was therefore tried in two cases of pure functional strabismus, both the little patients being about 4 years of age. For distance a practically full correction was ordered with a plus 2 sphere added for the bifocal segment. For the first month after putting on the glasses, atropin (½%) was used in both eyes each morning. The combination of bifocal glasses and atropin in both eyes seems to be the most complete orthoptic method yet devised for the abolition of habit spasm in the accommodative apparatus.

As it was experimental, these two pairs of glasses (which were prescribed about the same time) were ordered in lenticular bifocals, but they excited so much comment when worn by four year old children, and subjected the parents to such incessant questions from curious and interested persons that at the parents' request they were made up in invisible bifocals. By this time, however (at the end of about two months), the beneficial effects of the bifocals had become quite strikingly apparent. The atropin was withdrawn and at the end of two more months both children presented approximately parallel visual axes. Both had a deviation of about 30 degrees.

These experiments are now 3 years old. One child is still wearing an invisible bifocal as follows:

R. + 2.00 — .50 cyl. 75 degrees = 5/5.

L. + 3.00 + 1.00 cyl. 120 degrees = 5/6.

To this is added plus 2 sphere. The child is now seven years of age. The other of these two children discontinued the use of the bifocal after two years and for the past year has gotten along nicely with a full correction for all purposes. Since that time 9 other children with pure functional strabismus have been ordered invisible bifocal glasses. In the younger children — 3.00 sph. was added (2 to 4 years old). In the older ones a +2.00 was added (4 to 6 years old). The average deviation in these 9 children was 32 degrees which corresponds exactly with an average deviation found by me 10 years ago in a clinical and statistical study of convergent strabismus. (New York Medical Journal, Nov. 5, 1904).

I have been much impressed with the results shown in these 11 cases in that I think they are superior to those secured by the methods at present in vogue. In this series of 11 cases, 8 now have straight visual axes, two are vastly improved, while the remaining one showed very little improvement. In this last case the original deviation was 40, use of a full correction and atropin two months effected 15 degrees of straightening, an invisible bifocal was then used for 6 months and this produced only 10 degrees more of effect, so that while the cosmetic effect was somewhat bettered there remained 15 degrees of deviation. This child is now 5 years of age and while the parents are apparently quite satisfied with the improvement wrought by the method—(plus fusion training) I do not feel that the method I have suggested has accomplished anything much worth while in this particular case.

In brief, the idea is to set the spastic accommodative apparatus at rest, and we know of no more complete method than the one here offered, namely: ½% atropin solution once a day for two months with the use of an invisible bifocal, the atropin to be withdrawn at the end of this time. Naturally, fusion training should be carried on all the time in different ways (amblyoscope, stereoscope, bar reading, etc., etc.) Picture books, play blocks, alphabets of all sorts if small are strictly interdicted up to the 5th year. This may seem a hardship to the child but the end striven for justifies all the time and trouble required. There will always be parents who become impatient of this slower but surer method of straightening crossed eyes. To such parents it may be frankly said that they are in all probability denying their child the possible privilege of binocular vision.

There is one objection to the use of these invisible bifocals in very young esotropes that should be mentioned, that is, that the little patients begin at once to dodge the bifocal segment and for the first week or two bob their heads about a good bit. But they soon learn to adjust themselves to the new order of things and whatever good effect the bifocal produces upon the deviation will soon follow.

Eleven cases are far too few upon which to base any working conclusions. The only claim made is that this proposed addition to our ordinary methods is simple and harmless, and offers not only a logical sequence but a reasonable hope that a still greater number of young esotropes may not only escape the scissors but be vouchsafed the blessings of full binocular vision. Since writing the above, it has been learned that this same idea was advocated some years ago by Dr. Linn Emerson of Orange, N. J., and we are gratified to learn from him that our ideas confirm all that he has claimed.

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OPERATION FOR SQUINT.

by Claud Worth, F.R.C.S., England.

Convergent Squint.

Of the cases in which efficient treatment is carried out from soon after the first appearance of the deviation only a small proportion ever need operation. But in some cases, without any defect in any single muscle, there is a defect in oculo-motor balance which, if the fusion sense had been perfect, would have given rise to an esophoria. Many of these will eventually need operation. Rarely one meets a congenital paresis of an external rectus muscle; perhaps due to injury to the sixth cranial nerve during birth.

In children who first come under observation at a later period, if, after carrying out orthoptic treatment for a reasonably long time, measurements of the angle of the deviation show that this is not decreasing, the question of operation should be considered. It is necessary to *measure* carefully the angle of deviation at each visit, for I have records of some rare cases (which I have called "consecutive divergence") in which, in the course of years, convergent squint has gradually given place to divergence, without any operation having been performed. In all these cases the change was gradual and continuous; *there was no period during which the angle of the convergence was stationary.*

Some squinters who have some feeble degree of fusion sense, as well as many of those whose fusion sense has been educated by artificial means, are able to perceive a faint second image when their attention is especially called to it. Accurate operation here gives an ideal result, with binocular single vision. Inaccuracy, especially in a vertical direction, is apt to cause persistent and distressing diplopia; for a faint second image, which towards the periphery of the field is only with difficulty perceived, may be very obtrusive when it falls near the macula.

In the case of older children and adults, if the eyes are straight while glasses are worn but convergent when they are removed, usually glasses will be worn constantly throughout life and no operation will be needed. But if the refractive error be only of moderate degree, I give the patient the option of operation which will enable him to dispense with glasses except for reading. In the case of a boy whose proposed career might be adversely affected by the necessity of wearing glasses constantly, or a lady whose appearance is a consideration, the choice has usually been for operation, and no patient has had cause to regret the decision. The operation is advancement of one external rectus, or both. There is no tendency to divergence afterwards, whether glasses be worn or not. I have never performed tenotomy in such a case and believe that it would be especially dangerous. Glasses are left off for at least three weeks before operation.

Sometimes a convergent squint shows an upward deviation also. In at least five cases out of six this vertical deviation is only apparent, as is shown by the fact that when the deviating eye is made to fix, by covering the fixing eye, the latter turns in and *up* behind the screen. Sometimes, however, it shows a vertical deviation in a direction opposite to that previously exhibited by the other eye (true vertical deviation). Apparent vertical deviation disappears when the convergent squint is cured. True vertical deviation should be corrected by advancement of an inferior rectus muscle.

Divergent Squint.

Myopic divergent squint very rarely calls for operative treatment.

In the group of cases which I have called "neuropathic divergence," advancement of both external recti muscles is usually required. In many instances the eyes can be kept straight by a conscious effort, but they frequently diverge, especially when the patient is tired. The constant strain gives rise to continual discomfort or dull aching pain, and sometimes to "neurasthenia." I have operated upon such cases at all ages, from childhood to late middle age, removing both the deformity and the suffering.

Secondary Divergence.

In the cases in which tenotomy of an internal rectus results in divergence, the process is usually very gradual. After a year or two, or perhaps several years, the eye is noticed to be rather prominent and to have a slight outward "cast." The sooner the tenotomised internal rectus muscle is sought for and re-advanced the better, for, having once begun, the divergence will continue until, in many cases, it becomes a hideous deformity accompanied by ever-present discomfort due to the dragging upon the weakened structures. Though reposition should preferably be performed early, it is never too late. I have operated upon a great many such cases in middle age.

The Choice of an Operation.

In considering the ultimate result of any form of operative procedure for squint, general impressions, or conclusions drawn from cases which have been under observation for only a few years, are misleading. I have endeavored, as far as possible, to keep in touch with all my squint operation cases in private practice, as well as with my hospital cases up to December 1905. The task of corresponding with all the later hospital cases would have been too heavy. The patients are re-examined at intervals which, in the older cases, may be as long as three or four years. They are asked to inform me of any change of address, and any who may forget to return are written to.

I have arranged the cases up to December 1909, in three groups: (1) Those before the end of December 1901. A period of 13 years has elapsed since the most recent of these cases, and some of them have been under observation for nearly

20 years. Besides advancements, this group includes advancements combined with tenotomy of the opponent muscle, shortening of muscles, and simple tenotomies.† (2) Operations between January 1902 and December 1905. This group contains mostly simple advancements, some tenotomies combined with advancement, and scarcely any simple tenotomies. A period of 9 years having elapsed since the most recent of the operations in this group, one may draw reliable conclusions as to the ultimate result. (3) Cases between January 1906 and December 1909. This group consists almost exclusively of simple advancements. The net result of these long-continued observations is as follows:

Tenotomy of an internal rectus sometimes gives a good immediate result, or even a good permanent result. It often produces an insufficient effect. In cases in which the effect appears to be satisfactory, more often than not the eyes diverge five, ten, or fifteen years afterwards. I formerly considered tenotomy combined with advancement of the opposing muscle to be safe in high degrees of convergence: that was when my notes of such operations covered a period of less than ten years. Later experience has convinced me that tenotomy combined with advancement—though much safer than simple tenotomy—gives, in a large proportion of cases, results which are ultimately very unsatisfactory. Simple advancement by the method which I have employed for the last eighteen years gives results which do not increase or decrease with time. The result obtained after the operation is permanent. A surgeon who has sufficient skill and experience in the method can produce any desired result with certainty. The operation is a true advancement: the under side of the muscle does *not* form adhesions to the old insertion of the tendon. This I have proved by dissection when re-operating upon some cases in which I had underestimated or overestimated the effect required.

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†The tendon only was divided,—never the lateral expansions. But in more than half the tenotomies, the result, after a few years was bad. Fortunately, my custom of keeping in touch with these cases has enabled me to remedy, by secondary advancement, the harm which had been done.

One is apt not to hear of failures which only become evident long afterwards. In reply to remarks upon tenotomy, an eminent opththalmic surgeon replied that he thanked Heaven that his own experience was more fortunate. I was able to send him notes of two of his private tenotomy cases in which I had, years afterwards, operated for the relief of secondary divergence.

Small degrees of convergence or divergence may be corrected by advancement of one external or one internal rectus muscle. Larger defects should be dealt with by double advancement.

In several cases I formerly tried shortening the muscle and re-attaching it to its old insertion. This operation was abandoned chiefly because if one produces more than a very small effect by it, rotation in the opposite direction may be seriously interfered with.

The sole advantages of tenotomy are that anyone can do it, and the patient is not confined to bed afterwards. On the other hand, accurate and certain performance of advancement requires more skill and experience than any other operation in ophthalmic surgery.

Advancement.

A description of my advancement operation is to be found in many text-books and journals, so that it would be waste of space to repeat it here. Some minor improvements in technique have been made.

Formerly I used thick black silk which had been boiled in wax. It proved to be of uncertain strength, the fixing agent used in dyeing apparently having a tendency to rot the silk. The waxed silk was troublesome to prepare and difficult to keep sterile. Now I use thinner undyed silk and smaller needles. The needles and thread are anointed with sterile vaseline after boiling and immediately before use. The object of using the black thread is, of course, to facilitate removal. The following is a better plan: A piece of black silk is knotted on a thin probe. The ends are cut short and the probe is withdrawn, leaving a tiny ring of black silk. This is repeated until one has as many as may be required. A complete knot on the muscle has been found unnecessary; a half-hitch holds just as well. After the needle, threaded with white silk, has been passed inwards through conjunctiva, capsule, and muscle, and then brought out again in the reverse direction, a half-hitch is made instead of a complete knot. One of the tiny black rings is then threaded on the needle and pushed down the silk to the half-hitch. The needle is then passed inwards through all the structures to the under side of the muscle, as formerly. When the time comes for removal of sutures, a little black ring is picked up with forceps, and a snip with scissors divides the white silk in the right place, so that it all comes adrift and may be taken out in one piece.

There is an important point upon which I did not sufficiently insist in my original description of the operation. At the spot on the sclerotic to which it is proposed to attach the advanced end of the muscle, all loose tissue must be carefully removed with toothed forceps. And the cut end of the muscle must be carefully adjusted before tying the sutures, so that it is not inverted or everted. Unless the cut end of the muscle is held accurately in contact with bare sclerotic there will be no firm union.

In order to insure a permanent result I find it necessary to keep the patient as still as possible in bed with both eyes bandaged for ten days, at the end of which time union will be quite firm. A shorter time was formerly thought sufficient, but there were some relapses which have since been avoided. In private practice a special night nurse remains in the room constantly.

In operating under local anaesthesia the relative positions of the eyes can be tested while the sutures are being tightened. Under general anaesthesia this is not possible. For this reason formerly I did not care to use a general anaesthetic if it could possibly be avoided. At present I have no such objection. The angle of deviation has of course been measured; and the appearance of the eyes is studied immediately before operation. After long practice one learns to gauge the effect required by a sort of instinct, just as a violinist touches the strings unerringly at the right spots though he has no marks to guide him.

The sutures must have a firm hold in the sclerotic. No other mode of attachment can be depended upon. In my early operations I had many failures owing to the sutures having an insufficient hold in the sclerotic. Very gradually a deeper position was used, until a certain depth was found which has proved safe and has always given a secure hold. Desiring to ascertain by inspection what proportion of the thickness of the sclerotic was traversed by the sutures, I inserted my usual advancement sutures into the sclerotic of an eye which was about to be excised for malignant disease, and Mr. Greaves, the pathologist at Moorfields, kindly cut sections of it. My sutures traverse exactly two-thirds of the thickness of the sclerotic. This exact depth, which I have used for many years without accident, is certain and safe. But if a suture were inserted through the whole thickness of the sclerotic it would probably lead to loss of the eye; and I have heard of such a catastrophe.

A surgeon inexperienced in advancement, before attempting the operation upon a human eye, should practice long and assiduously upon pig's eyes until he can insert the sclerotic sutures with certainty to an exact and uniform depth. Then, in order to allow for the different thickness of the human sclerotic, he should insert the sutures in at least one human eye which is about to be excised for injury or disease.

In this paper, the personal pronoun seems to obtrude itself more than literary elegance would demand, but, in an account of one's own experience it can scarcely be avoided save at the expense of clearness of expression.

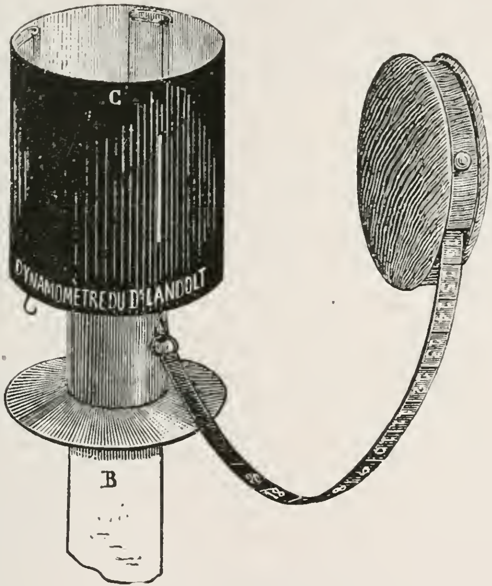
INSUFFICIENCY OF CONVERGENCE; ITS DIAGNOSIS AND TREATMENT.

By Dr. Edmond Landolt, Paris, France. Illustrated.
[Translated by Casey A. Wood.]

On several occasions I have pointed out the great importance and frequent occurrence of insufficient or weak convergence and that it is one of the principal causes of oculomuscular asthenopia. By the term convergence I include all symmetrical movements inward of the two eyes. By *positive* convergence I mean actual uniform convergence of the visual lines; by *negative* convergence, while the visual lines tend to approach yet the condition is really one of divergence. It is of anomalies of the first condition that I wish in particular to speak in this brief report.

First of all, it must be remembered that convergence should be considered as a whole, i.e., with reference to all the factors that make up this regular and combined movement, and these we generally consider as covered by the term *amplitude of convergence*. As you are aware, this condition is determined by considering the *minimum* and *maximum* of convergence, by noting the most distant point (*punctum remotum*) as well as the nearest point (*punctum proximum*) at which the patient can fix binocularly. It is evident that fixation of the same object by both eyes forms an angle of convergence which becomes larger the nearer the object is brought to the eyes. In other words, the size of the convergence angle is in inverse proportion to the distance that separates the eye from the object fixed. If, for example, that distance is represented by C, then the *degree or power* of convergence is equal to $\frac{1}{C}$. If we take the *metre* as our measure of the distance that separates the *point of binocular* fixation from each eye then we obtain expressions of convergence power in *metre angles.* Thus we find that binocular fixation of an object one-third of a metre from the eyes requires, for each eye, an effort of 3 *m.a.* of convergence.

When the convergence is *positive*, the simplest means of registering the convergent power and to express it in metre angles is by the use of my dynamometer, herewith pictured.



Landolt's Dynamometer.

This little instrument is provided with a luminous point, furnished by a candle whose light shines through an opening in the hollow cylinder, which is used as the fixation point. The angular degrees of convergence, corresponding to the distance between the distance from the point of light to each eye, are stamped on a tape measure that forms part of the instrument.

Experience has shown that the normal, maximum, positive convergence power equals 9 *m.a.* or more. On the other hand, the minimum (negative) power may be said to be 1 *m.a.*, that is to say, the diverging visual lines extended *behind the eyes* enclose an angle of that degree. To estimate the normal amplitude of convergence we employ this formula: $a = 9-(-1) = 10$ *m.a.* We may, in addition, depict the amplitude of convergence by the following chart:

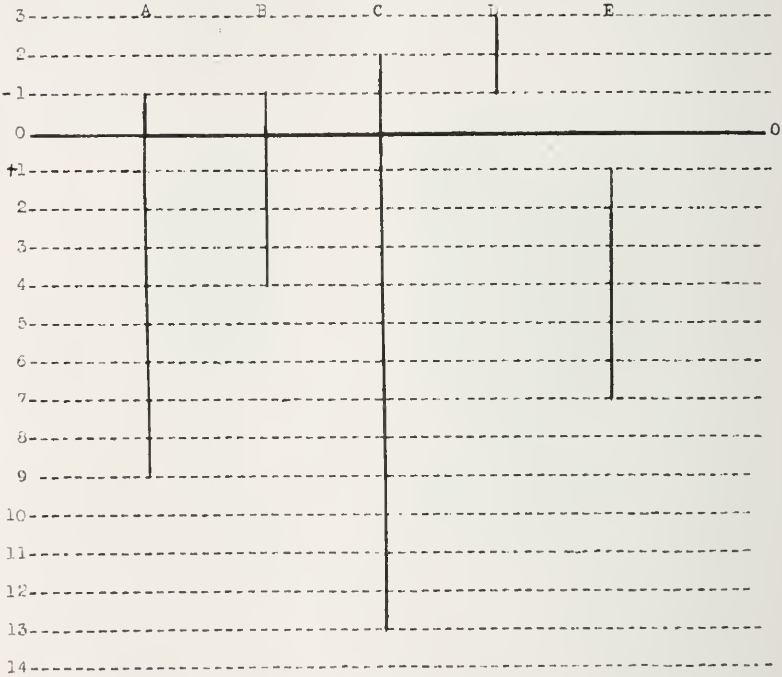


CHART SHOWING AMPLITUDE OF CONVERGENCE

The line 00 is supposed to represent the parallelism of the visual lines, where and when convergence is *nil*. Each of the horizontal, dotted lines corresponds to a metre angle. Above the line 00 the lines indicate divergence or negative convergence; below, positive convergence. *A* represents the normal amplitude of convergence, where $p = 9$ and $r = -1$ *m.a.* Frequently the maximum of convergence exceeds 9 *m.a.* Nevertheless we may accept the possession of 9 *m.a.* of convergence as normal for the important and practical reason that the individual exhibiting it is able to read, write and perform similar tasks without fatigue or other signs of muscular asthenopia.

In further explanation of the table, the line *A* corresponds to the normal minimum of convergent power. In other words $p = +9$ and $r = -1$; therefore $a = 9 + 1 = 10$ *m.a.* *B* = a reduction of positive convergence to 4 *m.a.*, showing an insufficiency of convergence equal to $a = 4 + 1 = 5$ *m.a.* C shows divergence (or excess convergence) of $p = 13$; $r = -2$; therefore $a = 15$ *m.a.*

In the case of D the amplitude is entirely negative. The patient is unable to converge but shows a divergence as follows: $p = -1$; $r = -3$; therefore $a = 2$ *m.a.*

E shows a positive amplitude of convergence. $p = 7$; $r = +1$; $A = 6$ *m.a.* This patient (with convergent strabismus) cannot even make the visual lines parallel, but always converges at 1 metre. In spite of this his best efforts show no more than 7 *m.a.* He presents, therefore, a weakness of both convergence and divergence.

In this last mentioned case, which we may regard as an insufficiency of both interni, a tenotomy of one or both externi is indicated.

When the convergent power of a patient falls below 9 *m.a.* he generally shows signs of muscular asthenopia. This is partly because of the distance from the eye of his working point. For example, with 8 *m.a.* the patient ought to read or write at 12 cm.; and few persons are able to do work so near their eyes.

However, there is another consideration not to be forgotten in this connection: it is not enough to estimate the ordinary working distance and the maximum of convergence. There must be a *reserve* of convergence force or power, and this requirement has been found to equal at least two-thirds of the amplitude of positive convergence. For this reason we regard 9 *m.a.* as the proper amount for ordinary eyes; and of this one-third i.e. 3 *m.a.* may be regarded as the amount required for work, and 6 *m.a.* as a reserve force. If, however, the patient desires to use his eyes at a nearer working point, say 25 cm., he would not be able to do it with his otherwise normal 9 *m.a.*, because only having a working capital of 3 *m.a.* he lacks 1 *m.a.* of the four needed for the distance, i.e., $\frac{1\text{m.}}{4}$

To sum up: to determine whether a patient's convergence is or is not sufficient for his needs we first estimate the number of metre angles corresponding to his usual working distance. Then we ask ourselves whether this amount is less than one-third of the working force required. If not he may work without extrinsic muscular strain. In other words, if we find with asthenopic symptoms, that one-third of the positive convergence is not below the number of metre angles required by the patient's usual working distance then it is highly probable the cause of the asthenopia is outside of the external muscle apparatus.

On the other hand, if the working distance, etc., call for more than one-third of the positive convergence power at the disposal of the patient this disparity will certainly, sooner or later, provoke symptoms of eye-strain. For example, a person forced to work at $\frac{1\text{m}}{3}$ has in all 6 *m.a.* of convergence, and requires for that purpose a working power of 3 *m.a.* and a reserve of 6 *m.a., or* 9 *m.a.* in all. He has, however, only 4 *m.a.* (two-thirds of six) in reserve and the balance 2 *m.a.* for work; hence is defective 3 — 2 = 1 *m.a.*

The *treatment* of insufficient convergence consists either in furnishing the patient with the required convergence (i.e. with additional metre angles of convergence) or in altering his working distance. The latter requirement is met, theoretically at least, by the prescription of prisms with their apices directed towards the temple—abductor prisms, one may call them. But if prismatic glasses are correct in theory are they of *practical* value?

If one desires to correct the refractive error of a myopic patient it is necessary to give him a glass corresponding to the amount of his ametropia: a minus 1 D. lens would be of no use to a myope with sixteen D. So is it with the correction of anomalies of convergence. If we decide to order prismatic glasses the lens correcting the ametropia should be combined with the prism but I would advice at first a weak prism—one not fully correcting the convergent error—and then increasing it until full strength is used. However it will, I believe, be found (just as I showed the unreliability of decentering lenses for their prismatic effect in this same condition) that the use of prisms in this fashion either produces other symptoms (apparent incurvation, coloration of objects, etc.) that are almost as objectionable as the muscular asthenopia itself, or they fail to relieve the asthenopic complaints of the patient.

It is generally the case that the convergence defect is more than one metre angle. In this instance there is little to be gained by resort to purely optical means for its relief: it is better to endeavor radically to increase the convergent power. Apart from rest, attention to the general condition and other hygienic measures—all of which are important and should ever be borne in mind in the conduct of all these cases—*operative measures are the most effective.*

It may be difficult to explain, but tenotomy of an ocular tendon does increase the duction power of its antagonist; and, as we generally desire to decrease divergence and augment convergence, simple tenotomy of one or both external recti would, at first blush, seem to be indicated in insufficiency of convergence. Moreover, as it is a simple procedure, and one more easily carried out than advancement, it appeals to many surgeons. However, my experience shows that, in addition to the danger of producing diplopia and other disagreeable consequences of a complete section of one or both abductor tendons, the muscular asthenopia (for which the operations is done) is not always relieved. This untoward result follows, to my mind, from interference with an important function of the externi—facultative or latent divergence. From these and other reasons I long ago abandoned tenotomy of the externi as a remedy for insufficient convergence in favor of *advancement of one or both interni.* The latter method is a logical procedure and one that infallibly augments convergence without interfering with the almost equally important relative divergence power. In other words it restores or brings about the normal relations of convergence and divergence.

I have demonstrated that a simple advancement of one internal rectus, without tenotomy of an antagonist, may increase the convergence power from 3 *m.a. to* 20 *m.a.* Thus, a single operation, performed on one eye, is able to change an insufficiency into an excess of convergence.

Strangest result of all (and very important) is that this apparently excessive addition of convergent power does not interfere with the important relative divergence. It is comparable with the well-known fact that in advancement of an internus for divergent squint, while it markedly increases convergence, does not limit the temporal excursions of the eyeball.

As to the degree and manner of advancement, when three or six (or more, because one need not be particular in this regard) *m.a.* of additional convergent power are required I always advance the tendon of one internus to the corneal margin.

For the reason I have just alluded to an apparent excess of operative convergence is not vital in these cases. Moreover, the extrinsic ocular muscles are not rigid bands of tissue to be mathematically measured by a millimetre rule; and one cannot surgically place them here or there as if they were pieces of metal. It must not be forgotten, either, that there are other considerations (tonus, innervation, etc.) besides length and position of an advanced tendon to be considered.

In any event we have the principal clinical fact, viz., that even an excessive result is almost invariably satisfactory, is not followed by additional symptoms and relieves the oculomotor asthenopia just as completely as if by operation a normal balance were secured. When by means of an advancement the patient secures twenty or even more metre angles of convergence he will use of the total amount only the portion required for comfortable near work.

One now and then meets with cases that after operation exhibit a normal or satisfactory convergence but whose muscles assume, after a time, a condition very like that which obtained before the advancement. These are invariably neuropaths—persons with defective motor innervation. In such patients, while a second advancement—of the internus tendon of the opposite eye—is indicated, treatment, directed to the general nervous condition, should be instituted in conjunction with the surgical intervention. Fortunately, such instances are very rare and the surgeon will find that advancement of a single internus tendon will suffice to cure practically all cases of muscular asthenopia dependent upon insufficient convergence.

EXTRA-OCULAR TENDON LENGTHENING AND SHORTENING OPERATIONS WHICH ENABLE THE OPERATOR TO REGULATE THE EFFECT.

(Description of Author's Methods, with Illustrative Cases.)

BY FRANK C. TODD, M. D., MINNEAPOLIS, PROFESSOR OF OPHTHALMOLOGY, UNIVERSITY OF MINNESOTA.

Operations upon the extra-ocular muscles should never be undertaken lightly. In the case of heterophoria, for instance, it is quite easy for an inexperienced operator, or one who has not studied his case properly, to leave the patient worse off than would be the case without an operation; and the many examples seen of extreme divergent strabismus resulting from free and complete tenotomy performed on young patients having convergent strabismus where no operation should have been performed at all, is evidence of the damage that may be done in cases of strabismus. It is not within the scope of this paper to discuss the question in detail as to the indications for various operations, but the author feels it incumbent to introduce this article with these words of caution.

The author has had many inquiries concerning his method of advancement and also concerning his method of lengthening an extra-ocular muscle since their publication.[1] Because of the interest manifested and because some slight improvements have been made in the technique as a result of added experience, at the request of the editor of the Record these operations are herewith described.

Many other operators in this and other countries are following the procedures described, with gratifying results in those cases where such operations are indicated. The writer has performed a great many of these operations, and has found them so satisfactory that no marked changes have been made in the methods. The descriptions here given are fuller than any heretofore, and some suggestions are made concerning after care—a few illustrated cases are appended.

The method of tenotomy described herewith does away with the dangers of over-correction that may arise from complete tenotomy, and also the possibility of creating a defect in an opposite place; while it enables the operator to regulate the effect to a greater degree. In any form of tenotomy, however, the ultimate effects cannot be accurately determined, because of the contraction that may take place at a later date. The advancement operation, consisting of a tucking of the tendon by the use of a tucker, enables the operator to exactly regulate the effect desired, and securely fastens the tendon, doing away with the dangers existing where the tendon is severed and advanced, that the stitch may cut its way out and produce the effect of a tenotomy.

To insure the best results, it is as important to observe asepsis in performing a muscle operation as is the case in a cataract or any eye-ball operation. The everted eyelids should first be flushed freely with a solution of one to five thousand bichloride of mercury. The adrenalin solution should be freshly boiled and the solution of 10 per cent cocaine should be allowed to come to a boil before using. The sterilized silk suture, just before insertion, should be dipped into a solution of one to five thousand bichloride. If there is much reaction after the operation has been performed, the patient should be put to bed and both eyes kept closed. Pain after any advancement operation is sometimes sufficient to warrant the administration of morphine, but such pain will usually wear off in a few hours' time at the most. It may be best in some cases to use atropine sufficient to relieve ciliary congestion for several days following the operation.

A complete tenotomy of an extra-ocular muscle effects a change of approximately 13 degrees. It should never be performed because it is inexact and because reattachment of the tendon may take place to one or the other side of the former attachment (in the case of a lateral muscle above or below its former attachment), thus resulting in the production of a deviation in another place. It is impossible to determine the amount of effect that may be produced by a complete tenotomy in any given case. When reattachment takes place it is further back on the globe and the control over the movements of the eye is considerably limited thereby. Altogether it seems to be an entirely unsurgical procedure, and one that does not allow of regulating the effect. Partial tenotomy of Stevens, which held such sway at one time, has been entirely abandoned because it is unsatisfactory and entirely ineffective. This we might naturally expect to be the case, for if we leave uncut any fibers of the tendon of an extra-ocular muscle, the tendon remains unchanged in its length.

The operation herewith described enables the operator to graduate the effect produced. A slight correction may be effected, or it is possible to secure as high a degree of correction as is the case when a complete tenotomy is performed, while the disadvantages of complete tenotomy do not exist. The attachment of the tendon is not changed; the tendon is merely lengthened.

This operation may be performed in two ways, as shown in the accompanying cuts (Figs. 1 and 2). A greater effect with less weakening of the tendon may be produced by the method shown in Fig. 2, where two cuts in the tendon are made on one side and one cut on the opposite side midway between the two first cuts.

While the severing of all but a few of the fibers of the tendon will produce no effect, if we sever a portion of the tendon on one side, and in another place on the opposite side, situated a short distance longitudinally from the first incision, sever the remaining fibers, we thereby lengthen the tendon. It is obvious that this means that the tendon must be cut beyond the middle on either side, and the longer the cut the greater the effect. In operating upon a lateral muscle, if complete and full effect is desired, one cut is made from the lower border of the tendon nearly to the edge of the upper border, leaving only a few fibers uncut; another incision is made a short distance from the upper border of the tendon nearly to the lower border of the tendon, leaving only a few fibers there uncut, or if two incisions are made on one side and another incision on the other side of the tendon midway between the two first incisions, a greater effect may be produced without carrying the incision as far as if only two incisions are made.

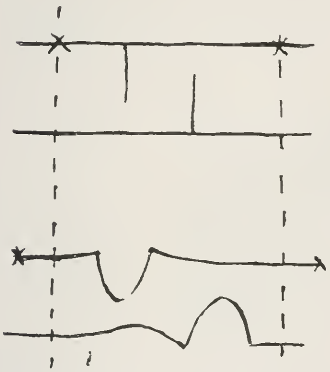


Fig. 1. The author's method of limited tenotomy with two cuts.

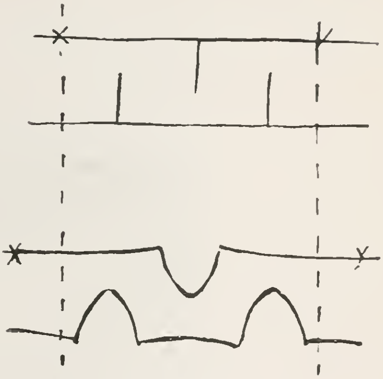


Fig. 2. The author's method of limited tenotomy with three cuts.

Description of the Operation of Limited Tenotomy.

The case having been thoroughly studied and it having been determined that this operation is indicated for the correction of heterophoria, the exact procedure where two cuts are made on one side and one on the other, is as follows:

Supposing a lateral extra-ocular tendon is to be lengthened. Make a small incision through the conjunctiva near the capsule of Tenon, just at the upper border of the tendon near its insertion, and parallel to the border of the tendon. With a strabismus hook lift up the tendon so that it may be exposed through the conjunctival incision. Now sever the tendon near its insertion, carrying the incision just beyond the middle from the upper border, then make another incision from the lower border, 3 mm. back of the first incision and parallel to it, carrying it just past the median line. Now make the third incision from the upper border 6 mm. back of the first incision and likewise parallel and of the same length as the first incision. While still holding this operated tendon upon the hook, pass a small Steven's hook above and below the tendon thus held to surely hook up any additional fibers of the tendon which may have been missed, and sever such border fibers. This is important, for if any fibers remain uncut, no effect will be produced by the operation. Now place the patient in front of a Phorometer, preferably the Maddox rod, and measure the muscle balance. If it is found that the correction desired has not been secured, the patient should again be put upon the table and the incisions in the tendon extended.

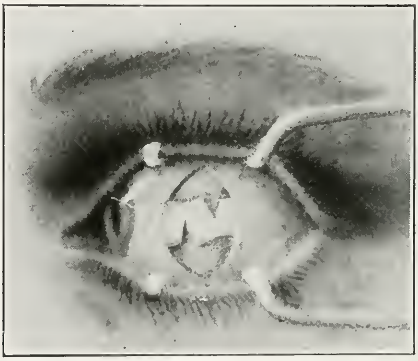


Fig. 3. Eye Showing Tenotomy.

A second measurement may be then made, and if more effect is required, the incisions may be further extended. Thus the effect may be graduated to the desired amount, measurements being taken between each step which involve lengthening the incisions and increasing the effect. In the case of any deviation it is always necessary to secure an over effect at the time of the operation, and the greater the error the greater the over effect required. In the case of a vertical deviation one should be careful not to exaggerate the effect to too great an extent, though the same rule holds true in most cases, that the greater the degree of error the more the over-correction required. (See cases 1 and 2 appended.)

In case the degree of error is so great that both eyes need to be operated upon, it is best not to operate upon the second eye until permanent results, as determined by repeated measurements, have been produced by the first operation. Such a stable condition will result in from one to two or three months after the operation. Then the second eye may be operated upon, and the effect graduated as described above. The operator will usually be able to determine from his experience in the operation upon the other eye how much effect should be produced in the second operation. (See case 2 appended.)

Description of the Author's Method of Performing the Tucking Operation.

To avoid confusion, and for the purpose of making the

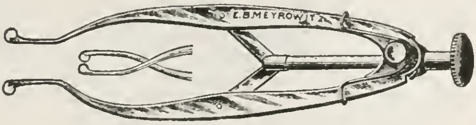


Fig. 4. Author's Tendon Tucker.

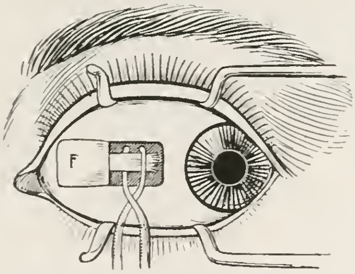


Fig. 5. Tucker Introduced.

description definite, the tucking of a specified muscle, the internal rectus, will be described. The external rectus has been tenotomized, in the manner described above. A flap of conjunctiva is dissected up and turned back, freely exposing the internal rectus tendon. This flap extends from within about 3 mm. from the margin of the cornea back about 6 mm. beyond the insertion of the tendon. The tendon is thoroughly freed of over-lying tissues so that it is bared. A strabismus hook is now placed under the tendon from above and the tendon is lifted from the globe with the hook to facilitate the introduction of the tucker.[2] The prongs of the tendon tucker (Fig. 4), *being crossed*, that one toward the internal canthus being uppermost, is placed under the tendon (inserting it at the lower border of the tendon) (Fig. 5). The strabismus hook is now removed. The thumb screw at the distal end of the instrument is turned to the right, causing the upper prong to pass toward the cornea over and past the lower prong, carrying with it a fold of the tendon, thus producing the tuck (Fig. 6). The amount of folding depends upon the degree of advancement required and the resistance of the tendon. It is well to gently scratch the tendon on the inside of the fold to better promote union. A needle armed with chromicized catgut (Van Horn's 0 or 00) and so threaded that the catgut will be double, is passed through the center of the two layers of folded tendon near the prong situated most distant from the corneal margin. This double thread is now cut near the needle, thereby creating two threads, one of which is now tied around the upper half of the tendon fibers at the upper margin (Fig. 6), and the other is tied around the lower half; thus two bundles of fibers are produced.

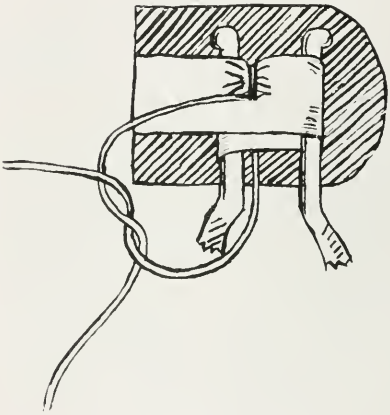


Fig. 6. Placing of catgut ligatures after tuck has been made.

Now pierce the upper bundle of fibers from under the folded tendon, just back of the already tied catgut ligature (Fig. 7A)—an assistant may tilt up the prong near the cornea to facilitate the introduction of this suture—then bring the suture through the upper portion of conjunctival flap (Fig. 7B). Now introduce the needle that is on the end of the suture which emerges from under the tendon into the epi-scleral tissues very near the margin of the cornea (Fig. 7C), and just above the median plane of the eye-ball, and bring it out about

3 mm. above the point of entrance (Fig. 7D). Pass another similarly double armed suture just back of the lower catgut ligature from under the folded tendon and through the lower margin of the conjunctival flap, and similarly pass the suture into the epi-scleral tissue from above downwards near the margin of the cornea, and just below the upper silk suture. (*It is easier and as well to insert the lower suture into the episcleral tissues later, after the tucker has been removed.*) The upper silk suture may now be tied with a single double twisted knot (not a hard knot). This will bring the conjunctival flap

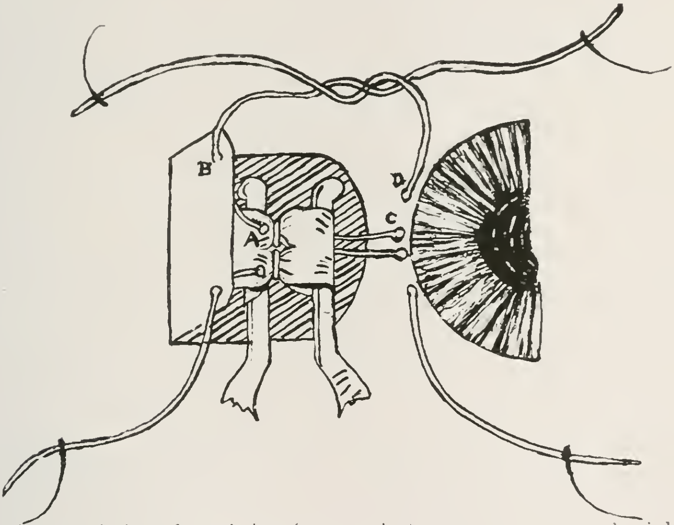


Fig. 7. Placing of regulating (or retention) sutures upper one to be tied with a single twist before tucker is removed.

back into place and hold the folded tendon in its new position. Now loosen the tendon tucker by turning the thumb screw at the distal end toward the left, when the tucker may be gently pulled out. If there is resistance, a strabismus hook placed between the prongs against the lower margin of the tendon will readily permit the tucker to come away. The lower suture is now similarly tied with a single double twisted knot (not a hard knot). The pressure on the eye-ball which has been exerted by the tendon tucker disturbs for the time being the exact position of the eye-ball; it now having been removed, the two eyes may be compared and the silk sutures which have only been tied with a single knot may now be tightened or loosened as is required to produce the desired effect. If the operator has made a correct estimate as to the amount of tucking required before inserting the catgut sutures, an accurate adjustment is now possible by the regulation that is permitted while tying the silk sutures. It is often desirable not to tie hard knots at this stage, but instead to make a bow knot of each suture, bringing the ends out at the internal canthus and fastening them there with a narrow strip of gauze which may be stuck down on the nose with collodion; but if the operator feels that the effect is just what is to be desired the two hard knots may be tied.

The silk sutures will not slip or cut along the fibers of the tendon as the pull is exerted against the catgut ligatures, and they are not liable to cut the scleral tissue, if they have been securely inserted and have included a sufficient amount of epi-scleral tissue, since they are located near the margin of the cornea and vertically placed. This method of inserting the sutures into the sclera divides the load of the pull and hence is far less liable to cut than where the sutures are inserted horizontally. It will be observed that these regulating silk sutures also serve to stitch the conjunctival flap into place.

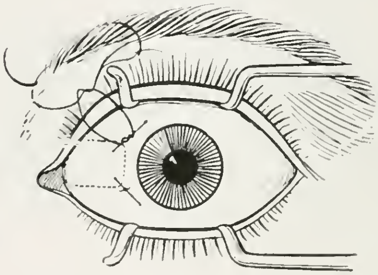


Fig. 8. Tying of Silk Sutures.

It is desirable in nearly all cases to secure a little over-correction, and if a bow knot is used, two days later the knot may be tightened or loosened, as may be required to produce the correct adjustment, and a hard knot tied.

The eye should be kept bandaged for a week, changing the dressing every day or two. The silk sutures should not be removed until they are loose and evidently of no service. Usually they are not removed until 11 days or two weeks after the operation. If, however, too much over-correction is manifest, they may be removed as early as such a mistake in the estimate is evident.

At the expiration of eight or ten days, I like to find the eyes perfectly straight, as the condition present at this time is apt to be permanent, and if there is over-correction, I remove the silk sutures, and if over-correction remains after their removal, the attachment should be loosened still further with a strabismus hook or scissors. This should not be necessary, but may occasionally occur, especially in the case of an inexperienced operator. I suggest this later regulating to be practiced when necessary to prevent the mistake of a permanent over-correction, for it must be remembered, that while the effects of a tenotomy may not be permanent, such is not the case when the tendon has become firmly attached after this tucking operation.

It is preferable to use cocaine anesthesia, as general anesthesia disturbs the physiologic balance, for instance, even in a case of convergent strabismus the eyes may diverge when the patient is asleep. If, however, it is necessary to use general anesthesia, the bow knot sutures should be used, and the exact regulation can be made several days later.

Following the tucking operation there is left a swelling on account of the folded tendon. This swelling always eventually disappears, but in some cases it lasts for a month and rarely for two or three months. Should the operator so desire, the folded end of the tendon after the sutures have been applied may be cut. I have not followed this procedure in my practice, as I have found it unnecessary and possibly disadvantageous.

The advantages of the tucking operation over other forms of advancement operations, as given by Savage, are:

"First, it is easier of accomplishment; second, its plane of rotation is less likely to be changed when there is no indication for changing it; third, the stitch is not so likely to cut its way out, and if it does so, or if the knot should become untied, the case would be no worse than before operation; whereas, if either of these accidents should happen to an advancement, before adhesion has formed, the recession of the muscle might be farther back than its original attachment."

In addition to these advantages, the following may be added:

1. Exactness. Careful adjustment of the position of the eye may be secured at the time of the operation when tying the silk sutures after the tuck has been taken. (*In nearly all*

advancement operations the operator is obliged to estimate the amount of the effect desired and does not know until his operation has been completed the exact amount of effect that has been produced.)

2. Security. When the operation is completed the stitches will not cut along the fibers of the tendon because of the catgut ligatures, and they are not apt to cut in the sclera if carefully inserted.

3. Ease. The operation is easier of performance because of the use of the tucker. It is very difficult to make a tuck in a tendon, especially if much effect is to be produced, without the use of some instrument to simplify the procedure.

4. Flexibility. A low degree of effect may be produced, or as high as 40 degrees of strabismus corrected by means of this operation.

5. Thus strabismus of very high degree may be corrected by operating upon one eye.

The cases herewith appended are examples of somewhat typical cases illustrating certain phases connected with the operation. Cases 3 and 4 are illustrated in the photographs shown.

Case 1.—Hyperphoria.—C. P., male, aged 48, consulted me March 5, 1904, suffering from headaches and inability to use the eyes at the near point. Marked nervous symptoms. Test under homatropine as follows:

R., 6/30, 6/6 + 1.25 ≍ + .50 × 90: R. H. 2°. Superduct 4°
L., 6/30, 6/6 + 1.75 ≍ + .25 × 180: Subduct 2°

This patient was fitted with glasses without prisms and later with partial and full correction with prisms; carried on prism exercises and resorted to the usual measures, receiving only temporary relief, this treatment having been carried on for a period of two years and eight months. The study of his case revealed finally a total of right hyperphoria of 3¾°.

Versions as shown by the tropometer:

	Super	Sub.	Ad.	Ab.
R.	45°	40°	50°	45°
L.	35°	40°	50°	45°

Operation.—After making a small conjunctival incision, incisions were made from each side of the tendon of the superior rectus of the right eye, one on the external side near the insertion, and the other on the inner side about two-thirds the width of the tendon from the first. Following the first cutting, measurements were made with the single prism and red glass test, which showed no correction; the patient was again put on the table and the length of the incisions increased, bringing about the correction of 1.5° as shown by the prism test; a third lengthening of the incisions resulted in 2° more. Desiring to secure an over-correction, a fourth lengthening of the incisions was made, creating 1° of over-correction. The conjunctiva was brought together with a horizontal suture and the eye covered with a pad.

Post-operative History.—First day, no diplopia; 0.5° over-correction.

Third, fourth, fifth and sixth days, from 2° to 2.5° over-correction shown.

Twelve days after operation orthophoria, superduct. 3.5°; subduct. 3.5°.

Six months later examination showed orthophoria, superduct. 2.5°; subduct. 2.5°; no exophoria, no esophoria.

Relief of symptoms.

Case 2.—V. N.—Aged 14, the daughter of a physician, has been under my care for six years. During this period I had tested her eyes every year or two and prescribed a correction for her hyperphoria and astigmatism. The last test under a cycloplegic showed:

R. + 1.50 ⌒ 3.25 × 90 6/6
L. + 4.00 ⌒ 1.50 × 105 6/6

For the first two years she did not wear her glasses regularly.

In February, 1912, she first manifested and complained of diplopia when looking at near objects; headache was a daily symptom. Exophoria increased each year thereafter, during which time exercises were carried on, and we found it necessary to gradually increase the prism correction.

July 1, 1914, she complained of seeing double a great deal of the time, and of having constant and severe headaches, and was only able to do her work by wearing lenses containing 5° prisms, base in, before each eye. Patient suffered much in spite of all that could be done in the way of glasses and exercises. She had developed an exophoria at 30 cm. of 21°, and at 6 m. 11°, adduction 7°, abduction 13°.

Limited tenotomy performed July 1, 1914, in the left eye, two incisions being made on one side of the tendon and one on the other side midway between. The incisions were all carried nearly across the tendon, leaving only a few fibers uncut. The tendon could be lifted loosely from the eye, and as much effect was produced as could have been produced by complete tenotomy. Measurements immediately after the operation showed that 11° of correction for 6 m. had been effected. Subsequent measurements were as follows:

July 3—Exophoria 1° at 6 m.

July 6—Exophoria 1°; prescribed convergent exercises.

August 14—Exophoria 4° at 6m., 14° at 30 cm., seeing double at distance when doing close work.

Versions as shown by the tropometer:

	Up	Down	Out	In
R......	50	50	60	60
L......	45	50	50	60

August 14, performed limited tenotomy on the right external rectus, securing as much correction as was possible by three cuts in the same manner as the previous operation. Immediately after operation esophoria for distance 9°. Repeated tests taken thereafter showed a gradual reduction and measurements showed:

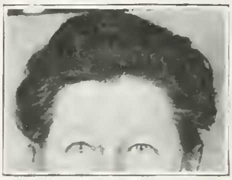


Fig. 9.
Case 3. High degree convergent strabismus since early childhood. Operated when 41 years of age by tucking and tenotomy (see case description).

October 9—Orthophoria at 6 m.
Exophoria 5° near.

All tests were made with correction glasses worn.

November 7, muscle measurement same as last test. Advised convergence exercise.

Patient has been comfortable and able to go on with her school work, has had no headaches since the last operation, and the muscle measurements are stationary.

Case 3.—Mrs. G. E. A.—Aged 41, consulted me January 22, 1908, convergent strabismus since early childhood. The left eye turned in when fixing with the right eye, sometimes to such a great extent that little of the cornea could be seen.

Measurements showed not less than 35° convergence. Test under homatropine as follows:

R. 6/9 6/6 + .50

L. 6/ 6/18 + .50 ⊂ 1.25 × 90. Pa

Patient unable to fix with the left eye, which wavers.

January 23, 1908.—Under cocaine anesthesia, limited tenotomy of the left internal rectus, tucking of the external rectus, producing exact parallelism with single binocular vision, so that the eye could be measured with the Phorometer, and responded positively to test with stereoscope.

November 16, 1914.—When this photograph was taken herewith shown (Fig. 9), esophoria 2° at 6 m. To the Hering test patient responds positively 19 out of 20 times (all distances), and positively to the Verhoeff fusion test.

Case 4.—B. D.—Aged 14, alternating convergent strabismus (Fig. 10), had been wearing glasses fitted by me for two years, full correction. Under cycloplegic test:

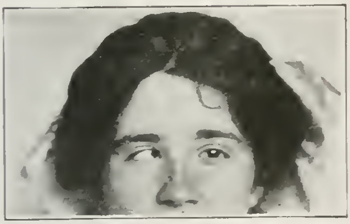


Fig. 10. B. D. (see case report). Limited tenotomy and tucking operation.

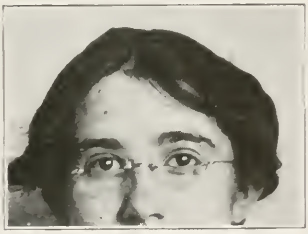


Fig. 11. B. D. (see case report). Limited tenotomy and tucking operation.

R. 6/18 6/6 + .75 ⊂ + .75 × 95

L. 6/6 6/5 + .50 ⊂ + .50 × 90

Versions as shown by the tropometer:

	Out	In	Up	Down
R.	20	60	40	40
L.	40	62	45	40

Operation.—June 15, 1911.—Limited tenotomy on the internal rectus and tucking of the external rectus of the right eye, under cocaine anesthesia.

Various tests made after the operation and at present date, November 17, 1914, showed *orthophoria.* Fuses images with the Worth Amblyoscope, and responds positively to the Hering test, but not to Verhoeff's fusion test. Photograph will show perfect parallelism (Fig. 11).

The question has been raised as to whether or not it is possible to develop the fusion faculty after an operation for strabismus, especially in the case of an adult. It will be seen in the case of Mrs. G. E. A., being a woman, 41 years of age, having had convergent strabismus since early childhood, whose vision at our first test showed 6/18ths, but improved to 6/6 + after operation, secured perfect parallelism as shown by the photograph, and single binocular vision developing the fusion faculty.

Bibliography

[1]A Method of Performing Tenotomy Which Enables the Operator to Limit the Effect as Required.

Published in the Journal of the American Medical Association, 1907.

[1]An Exact and Secure Tucking Operation for Advancing an Ocular Muscle.

Published in the Journal of the American Medical Association, Jan. 7, 1905.

[2]This instrument is universal, i. e., it can be used on any of the recti muscles. Many of the instruments have been imperfectly made, the commonest fault being a sharp point and inefficient hook at the ends of the prongs so that the instrument slips out during the operation. If correct, the instrument will cause no such annoyance.

ERRATA.

Dr. G. C. Savage desires to call attention to the following errors in his article in the November RECORD:

On page 561, third line from the bottom, Fig. 4 should be Fig. 3, and in the second line from the bottom, Fig. 5 should be Fig. 4. On page 562, in the middle of the paragraph beginning with "Again," Fig. 4 should be Fig. 3 and Fig. 5 should be Fig. 4. Again on page 563, about the middle of the page, Fig. 4 should be Fig. 3. Then again on page 564 in the second paragraph under "Treatment," Fig. 4 should be Fig. 3 and Fig. 5 should be Fig. 4. This error exists in the midddle of the paragraph as well. Again on page 566, the same error is repeated towards the bottom of the first paragraph. Here as elsewhere, Fig. 4 should be Fig. 3 and Fig. 5 should be Fig. 4.

A recent report on the number of special magazines devoted to ophthalmology states that there are nine such periodicals published in Germany; nine in Italy; seven in the United States; six in France; three each in Spain and Mexico; two each in England, Japan and Hungary; and one each in Austria, Poland and Russia.

REPORTS OF SOCIETIES

WILLS HOSPITAL OPHTHALMIC SOCIETY.

DR. S. LEWIS ZIEGLER, CHAIRMAN, MAY 4, 1914.

Tubercular Kerato-Iritis; Increased Tension; Pain; Contracted Fields of Vision.

Dr. S. D. Risley presented a sturdy Italian fruit dealer, aged fifty-one years, who had been referred to his clinic at the Wills Hospital in February, 1914, with painful eyes, marked impairment of vision and contracted fields. O. D., V. = 6/xv., field contracted to 15° and nearly concentrically. The fundus was fluffy, and details blurred; no cupping could be determined. The anterior ciliary vessels were dilated, but did not present the appearance of a chronic inflammatory glaucoma. O. S., V. = 3/22, and field contracted to a small area around fixation point. T., 52. The man suffered greatly from pain in the eye and left side of head and occiput. The cornea was not steamy; the pupil was not dilated, but contracted under eserin; the nerve was deeply cupped.

He was admitted to the hospital March 14, 1914 and placed on hot stupes locally, and magnesium sulphate internally. Two days later, March 16th, a broad peripheral iridectomy was done in the left eye, and was followed by complete relief from pain. The wound closed promptly, but the convalescence was slow, the eye remaining red and uncomfortable, and the wound pouting. The tension sank to 15, but occasionally rose to 30 or even 32 mm.

On March 25th, one week after the iridectomy, a small nodule appeared on the iris below the coloboma; and several gray dots, on the posterior surface of the cornea, near the angle of the anterior chamber. The von Pirquet test was markedly positive, and produced a rise of temperature and local reaction in both eyes. This was followed, in a few days, by improvement in the ocular conditions and general health. The tension in both eyes fell to normal, the discomfort and injection disappeared, and the fundus cleared.

Dr. Risley called attention to the fact that notwithstanding that no operation had been done on the right eye, the fundus cleared, the tension fell to normal, and the field and central vision improved under the general regime and the tuberculin injections. He thought that the original ocular infection was doubtless in the uveal tract, the tubercule on the iris and the deposits on the posterior surface of the cornea at the angle coming later; and that the products of uveal inflammation had blocked the excretory channels and produced the increase of tension and the glaucomatous sequelae. He said that he had presented the case as an interesting illustration of the clinical history and pathologic significance of uveal disease in the production of increased tension of the eyeball. The increased tension, he regarded as a sequel to the uveal disease due, in the case presented, to tubercular infection.

PITUITARY TUMORS.

Dr. T. H. Weisenburg (by invitation) said that the pituitary body is made up of two lobes, an anterior and a posterior. The anterior is the glandular part. It is supposed that the pituitary secretes a substances which gets into the cerebrospinal fluid, and exerts its influence in that way. A lesion of the pituitary body causes two sets of symptoms: one, the result of involvement of the pituitary; and the other, the result of pressure on the neighboring structures.

The first symptom of pituitary disease would be due to involvement of the optic chiasm, since the gland lies in the sella turcica, the upper outer temporal field usually being first involved. The color field is disturbed first. This is not unusual. A brain tumor exerting intracranial pressure will do likewise.

After color and form fields go, the macula is implicated. Here, also, color goes first, and form afterwards. Then follows loss of the nasal field, as well as the temporal. The second symptom is optic atrophy. This is primary, and not secondary to choked disc.

If you examine a patient and find bitemporal hemianopsia or complete loss of vision, the question is whether to operate or not; and whether, if you do operate and remove the tumor, a return of vision will occur. In many cases, you do get this, in spite of seemingly complete blindness. The reason is that the loss of vision is due to the fact that there is complete blocking of impulses from the periphery to the primary visual centers, and not to degeneration of the optic nerve fibers. One should base the decision in regard to operation, not on loss of vision, but on the degree of optic atrophy.

(Continued.)

NEWS AND NOTES.

Personals and items of interest should be sent to Dr. Emory Hill, 122 South Michigan avenue, Chicago, Ill.

As these columns go to press on the 15th of the month previous to publication, contributors will kindly send in their items before that date.

Dr. and Mrs. Major Worthington announce the birth of a daughter, Mary Jane Worthington.

Dr. Cassius D. Wescott spent the month of November on a hunting trip in northern Michigan.

Dr. Robert Sattler has resigned as senior ophthalmologist to the Cincinnati Hospital and has been succeeded by Dr. Victor Ray.

A new ophthalmic organization was created under the name of the Ophthalmological Society for the North of England, at a meeting at Manchester on October 15.

The Wills Eye Hospital was one of several institutions to receive a bequest of $5,000 by the will of the late Henry B. Palethorp.

Dr. Wm. H. Wilder of Chicago has resigned as surgeon to the Illinois Charitable Eye and Ear Infirmary after a continuous service of twenty-three years.

Dr. Alfred W. Hornbogen of Marquette was elected vice-president of the Michigan State Medical Society for the ensuing year.

One of the five fellowships given by the medical school of the University of Minnesota has been awarded to Dr. Henry E. Binger of Minneapolis for advanced work in eye, ear, nose and throat diseases.

The staff of the Cincinnati General Hospital, at a meeting on October 29, passed resolutions of thanks to Dr. Christian R. Holmes for his service in aiding the establishment of the new hospital and organizing its work.

Dr. E. V. L. Brown of Chicago has resigned from the Illinois Charitable Eye and Ear Infirmary in order to devote his time to his service at the Cook County Hospital. Dr. Brown is succeeded by Dr. Francis Lane as surgeon, who will be assisted by Drs. Hoffman, Fowler and Maghy.

Further study of the trachoma problem in Virginia reveals the existence of this disease in the mountainous western section of the state. The State Board of Health is co-operating with the national public health service in the effort to eradicate trachoma, and a hospital has been built for this purpose.

The Minnesota Academy of Ophthalmology and Oto-Laryngology has elected the following officers: Dr. E. J. Brown of Minneapolis, president; Dr. J. H. James of Mankato, vice-president; Dr. Thomas McDavitt of St. Paul, second vice-president, and Dr. John Morse of Minneapolis, secretary-treasurer.

The Chamber of Commerce of the United States of America, representing 600 local boards of trade, has undertaken the study of uniform food and drug regulation throughout the Union. At a meeting in Washington on October 8, committees were appointed to investigate the subject.

The following deaths of ophthalmologists are announced:
Cyrus J. Seltzer of Lebanon, Pa.
Charles S. R. Reed of Utica, N. Y.
Robert Hamilton of Liverpool, England.
William Edward Hamill of Toronto, Canada.

A survival of a filthy and pernicious custom is indicated in a recent letter to the medical editor of a newspaper, asking whether it is safe to remove a cinder from a friend's eye by applying the tongue to the eye. We have not outgrown these customs, evidently, though we live in a community where ordinary cleanliness is supposed to be in vogue.

Armour & Company announce that Pituitary Liquid, solution of the active principle of the posterior substance is now standardized by the Roth method, described in his article in the July, 1914, number of *Journal of Pharmacology and Experimental Therapeutics.*

There is one prayer which every physician should make when he enters upon the practice of a specialty, and that prayer is: May the Unseen Powers keep me from becoming strabismic, keep me from seeing or imagining the special disease of my specialty in every human being. And he should repeat this prayer every morning, on entering upon his day's work.—*Critic and Guide*.

The following appointments are announced:

Joseph W. Charles of St. Louis, member of the Board of Managers of the Missouri School for the Blind.

Edward H. E. Stack, ophthalmic surgeon to the Bristol (England) Royal Infirmary.

M. W. B. Oliver, assistant ophthalmic surgeon to the Miller (England) General Hospital.

Geoffrey Viner, assistant surgeon to the Royal Westminster (England) Ophthalmic Hospital.

Mr. Angus Macnab, F. R. C. S., Chief Clinical Assistant to Mr. Claud Worth at the Royal London Ophthalmic Hospital (Moorfields), was killed on November 1. Mr. Macnab was a captain in the London Scottish Volunteers and was killed during a charge at Ypres. The many friends of this keen scientific worker and very skillful surgeon will feel the greatest regret at his loss. These are the deaths which bring us closer to the horrible events of this unnecessary war. The best of the manhood of Europe is being slaughtered and a century of time will scarcely repair the damage.

BOOK NOTICE.

A Manual of Biological Therapeutics. Sera, bacterins, phylacogens, tuberculins, glandular extracts, toxins, cultures, antigens, etc. 174 pages. Cloth. Press of Parke, Davis & Company. 1914.

CHICAGO EYE CLINICS.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.	Richard S. Pattillo (P.-G.) G. W. Mahoney (Poli.) R. B. Stephenson (P.-G.)	*Geo. F. Suker (P.-G.) C. H. Francis (Poli.) A. Duncan (P.-G.)	W. F. Coleman (P.-G.) S. M. Hager (Poli.) H. N. Lyon (P.-G.)	G. W. Mahoney (Poli.) Rich'd S. Pattillo (P.-G.) R. B. Stephenson (P.-G.)	C. H. Francis (Poli.) R. B. Stephenson (P.-G.)	S. M. Hager (Poli.) C. W. Hawley (P.-G.) H. J. Morlan (P.-G.)
10 A.M.	Brown Pusey (N.W.U.) Geo. T. Jordan (N.W.U.) Robert Blue (N.W.U.) Every day, 10-12 A. M.					
1 P.M.	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) E. V. L. Brown (County) and Geo. F. Suker (County) Daily, 2:30 P. M.	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffmann (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *H. W. Woodruff (Inf. *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) *Frank Allport (St. Luke's) *Frank Brawley (St. Luke's) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) *Paul Guilford (St. Luke's) *Casey Wood (St. Luke's) *T. A. Woodruff (St. Luke's) J. B. Loring, (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)	M. H. Lebensohn (Inf.) Willis O. Nance (Inf.) D. C. Orcutt (Inf.) N. E. Remmen (Inf.) Emily Selby (Inf.) *Oscar Dodd (Inf.) C. A. Leenheer (Inf.) D. W. Eiss (Inf.) E. R. Cressley (Inf.) C. C. Clement (Inf.) H. W. Woodruff (Inf.)	*Chas. H. Beard (Inf.) W. Allen Barr (Inf.) E. K. Findlay (Inf.) Wm. E. Gamble (Inf.) J. B. Loring (Inf.) *Wm. H. Wilder (Inf.) S. L. McCreight (C.C.S.) E. V. L. Brown (Inf.) Robt. Von der Heydt (Inf.) L. G. Hoffman (Inf.) A. P. Hunneman (Inf.) M. Goldenberg (Inf.) Francis Lane (Inf.) H. Walker (Inf.)
3 P.M.	*Wm. E. Gamble (U. of I.) Wm. H. Wilder (Rush) H. S. Gradle Daily 3-5 (E. M. D.)		W. Allen Barr (C.C.S.) *Wm. E. Gamble (U. of I.)	Wm. H. Wilder (Rush)	W. Allen Barr (C.C.S.)	Geo. F. Suker (P.-G.) 2-5 H. Cuthbertson A. Duncan
4 P.M.	W. F. Coleman (P.-G.) H. N. Lyon (P.-G.) 2-5	C. W. Hawley (P.-G.) 2-5 J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	J. B. Loring (U. of I.) E. K. Findlay (U. of I.) G. F. Suker (P.-G.) 2-5 H. Cuthbertson (P.-G.)	C. W. Hawley (P.-G.) J. F. Campbell (P.-G.) H. J. Morlan (P.-G.)	W. F. Coleman (P.-G.) 2-5 H. N. Lyon (P.-G.)	

*Special operative eye clinic.

ABBREVIATIONS:

C. C. S.: Chicago Clinical School, 1844 W. Harrison Street.

E. M. D.: Emanuel Mandel Dispensary, 1012 Maxwell St.

County: Cook County Hospital, W. Harrison and Honore Streets.

Inf.: Illinois Charitable Eye and Ear Infirmary, Peoria and Adams Streets.

Poli.: Chicago Policlinic and Hospital, 221 W. Chicago Avenue.

P.-G.: Post-Graduate Medical School of Chicago, 2400 Dearborn Street.

N. W. U.: Northwestern University, 2431 Dearborn Street.

Rush: Rush Medical College, W. Harrison and Wood Streets.

St. Luke's: St. Luke's Hospital, 1416 Indiana Avenue.

U. of I.: College of Medicine, University of Illinois, Congress and Lincoln Streets.

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